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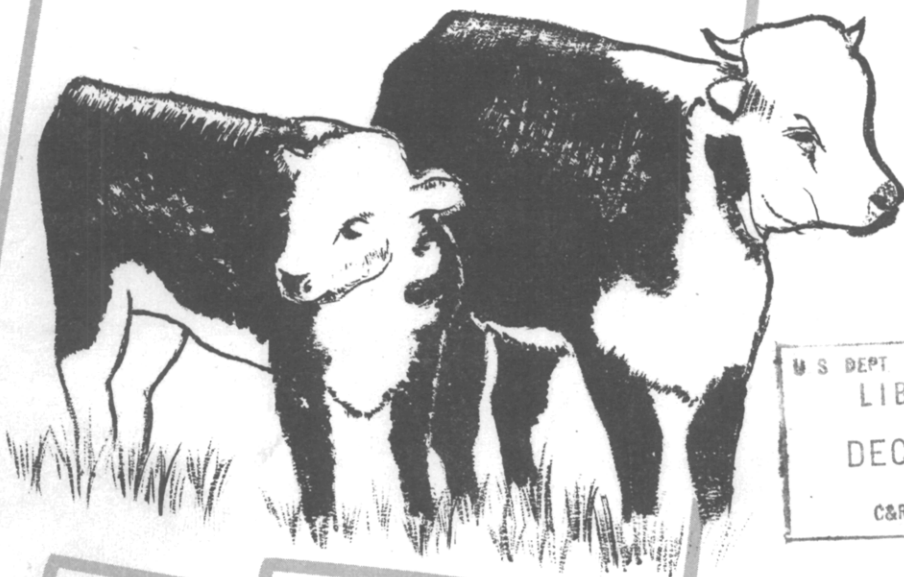
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Cattle Ranches

Organization, Costs, and Returns

**Southwestern Nonmigratory
Grazing Area 1940-59**



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**Agricultural
Economic
Report No. 1**

**Farm Economics Division
Economic Research Service
U. S. DEPARTMENT OF AGRICULTURE
in cooperation with
Agricultural Experiment Station
NEW MEXICO STATE UNIVERSITY**

PREFACE

END

The study reported here is one of a group of nationwide studies of commercial farms and ranches by type and size in the United States. It is the fifth that deals exclusively with western livestock ranches.

The study was carried on cooperatively by the Farm Economics Division, Economic Research Service, and the New Mexico Agricultural Experiment Station.

H. B. Pingrey (deceased), recently of the New Mexico Agricultural Experiment Station, assisted in collecting, analyzing, and interpreting the material included in this study. The Texas and Arizona experiment stations also assisted.

Other reports dealing with COMMERCIAL FAMILY-OPERATED FARMS AND RANCHES:

Brown, W. H. Cotton Farming in the Southern Piedmont, 1930-51; Organization, Costs, and Returns. U. S. Dept. Agr. Agr. Inform. Bul. 89, 64 pp., illus. 1952.

Fowler, H. C. Changes in Dairy Farming in the Northeast, 1930-51. U. S. Dept. Agr. Agr. Inform. Bul. 86, 55 pp., illus. 1952.

Fox, A. S. Changes in Organization, Costs, and Returns on Dairy-Hog Farms in Southeastern Minnesota, 1930-1959. U. S. Agr. Res. Serv. ARS 43-124, 48 pp., illus. 1960.

Gray, J. R., and Baker, C. B. Commercial Family-Operated Sheep Ranches, Range Livestock Area, Northern Great Plains, 1930-50; Organization, Production Practices, Costs, and Returns. Mont. Agr. Expt. Sta. Bul. 478, 94 pp., illus. 1951.

_____ and Baker, C. B. Sheep Ranching in the Northern Great Plains. Mont. Agr. Expt. Sta. Cir. 196, 19 pp., illus. 1951.

_____ and Baker, C. B. Organizations, Costs, and Returns on Cattle Ranches in the Northern Great Plains, 1930-52. Mont. Agr. Expt. Sta. Bul. 495, 107 pp., illus. 1953.

_____ and Baker, C. B. Cattle Ranching in the Northern Great Plains. Mont. Agr. Expt. Sta. Cir. 204, 19 pp., illus. 1953.

Hochmuth, H. R. Commercial Family-Operated Sheep Ranches, Intermountain Region, 1930-50; Organization, Costs, and Returns. U. S. Dept. Agr. Agr. Inform. Bul. 85, 71 pp., illus. 1952.

_____ and Goodsell, W. D. Commercial Family-Operated Cattle Ranches, Intermountain Region, 1930-47; Organization, Costs, and Returns. U. S. Bur. Agr. Econ. F. M. 71, 29 pp., illus. 1948. (Mimeographed.)

Hole, E., and Bondurant, J. H. Farming in the Bluegrass Area of Kentucky; Operations, Costs, and Returns, 1930-48. Ky. Agr. Expt. Sta. Bul. 544, 51 pp., illus. 1949.

_____ and Bondurant, J. H. Farm Costs and Returns... Commercial Family-Operated Tobacco-Livestock Farms, Bluegrass Area of Kentucky, [Annual] 1949-57. U. S. Bur. Agr. Econ. 1950, F. M. 83, 1951; 94, 1952; 106, 1953; PERB 2, 1954; U. S. Agr. Res. Serv. ARS 43-16, 1955; ARS 43-54, 1957; ARS 43-77, 1958. (Mimeographed.)

_____ and McPherson, W. W. Farming in the Coastal Plains of North Carolina—Costs and Returns, Tobacco-Cotton and Tobacco Farms, 1940-54. N. C. A. E. Inform. Ser. 47, 60 pp., illus. 1955. (Mimeographed.)

Hurd, E. B. Wheat-Pea Farming in Washington and Idaho, 1935-53, Farm Costs and Returns. U. S. Dept. Agr. Cir. 954, 42 pp., illus. 1955.

Rauchenstein, E., Wilcox, W. W., and Smith, E. J. Changes in Dairy Farming in Wisconsin, 1930-1948. Wis. Agr. Expt. Sta. Res. Bul. 166, 40 pp., illus. 1950.

U. S. Agricultural Research Service. Costs and Returns... Commercial Family-Operated Farms, by Type and Size, 1930-51. U. S. Dept. Agr. Statis. Bul. 197, 67 pp., illus. 1956.

U. S. Agricultural Research Service. Farm Costs and Returns... Commercial Farms... [Annual] 1955-59. U. S. Dept. Agr. Agr. Inform. Bul. 158, 1956; 176, 1957; rev. 1958 and 1959; 230, 1960 and 1961.

U. S. Bureau of Agricultural Economics. Farm Production Practices, Costs, and Returns. U. S. Dept. Agr. Statis. Bul. 83, 115 pp., illus. 1949.

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CATTLE RANCHES: ORGANIZATION, COSTS, AND RETURNS SOUTHWESTERN NONMIGRATORY GRAZING AREA, 1940-59

By James R. Gray and Wylie D. Goodsell¹

SUMMARY

Cattle herds on commercial family-operated ranches, as defined in this report, varied in size in the Southwestern Nonmigratory Grazing Area from 80 to 640 head. The data presented represent averages per ranch.

Size of the average ranch increased from 7,676 acres in 1940 to 11,100 acres in 1959, or 12 sections of land in 1940 to 17.4 sections in 1959. Neither land grazed under permit nor pastureland rented on a per head basis are included as part of the total land in ranch. Leased acreages remained fairly constant. Most of the increase in average size of ranch resulted from purchase of lands by ranch operators.

Cattle numbers per ranch on January 1 varied from 213 head in 1940 to 227 head in 1952. Horse numbers per ranch declined from about 12 head in 1940 to less than 6 in 1959. Other types of livestock were of minor importance on cattle ranches in this area. Based on the number of calves raised per 100 cows and heifers 2 years old and over in the herd on January 1, the calf crop varied from 71 to 82. Average marketing weights of calves varied from 332 to 424 pounds. These production rates appeared to increase during or following periods of favorable precipitation, 4 of which occurred during the 1940-59 period. Similarly, net turnoff of beef per cow ranged from approximately 300 to 420 pounds. Turnoff of beef also increased in or after periods of favorable weather.

On the basis of total weight sold, sales of calves made up about 49 percent of total sales, yearlings 20 percent, and mature cattle 31 percent. By this measure, sales of calves increased by 13 percent from 1940-44 to 1950-59. Sales of yearlings

dropped 32 percent, and sales of mature cattle gained 7 percent.

The estimated value of investment per ranch was high relative to livestock ranches in other areas. It averaged about \$36,000 in 1940 and about \$158,000 in 1959. Investments in real estate varied from 68 to 82 percent of these total amounts. Livestock investment per ranch ranged from about \$8,000 in 1940 to about \$40,000 in 1952. Investments in machinery, feed, and supplies were insignificant when compared with the total investment. A part of the investment resulted from heavy expenditures during the period for range improvements. In 1954, an estimated 30 percent of land values was attributed to range improvements.

Cash receipts per ranch varied from about \$4,000 in 1940 to more than \$18,000 in 1951. Nearly all of the cash receipts on these ranches is from the sale of cattle. Payments for range-improvements were the largest item of miscellaneous receipts, but even payments from this source have made up a very small part of the total cash receipts.

Cash expenditures were divided into 10 categories. Expenditures for feed and grazing fees were the most important. Expenditures for feed varied from about \$1,000 in 1941 and 1942 to about \$4,700 in 1952. The next most important expense was for ranch buildings and improvements, although expenditures in this category have been moderate in recent years. Livestock purchases ranked third. Replacement bulls and calves and cows were bought in most years from 1940 to 1959. Purchases of machinery and other machinery expense have become major items of cost only in recent years. Expenditures for hired labor have been moderate and fairly constant costs on cattle ranches.

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Taxes on real estate and personal property, although rather modest when compared with taxes on farms of equivalent size in other agricultural areas, has been a constant and increasing expense on southwestern cattle ranches.

In general, net income per ranch has been fairly modest on southwestern cattle ranches. Good prices for cattle and favorable weather have seldom coincided. After incomes reached moderately high levels in 1942 and 1943, expenses rose faster than receipts, reducing net ranch incomes to lower levels. Favorable prices for beef cattle starting in 1947 permitted net ranch income to increase sharply, from about \$2,400 in 1946 to \$4,100 in 1947, to about \$6,500 in 1948 and 1949, and finally to a high plateau of about \$9,200 in 1950, 1951, and 1958. Extremely high costs in 1951 and 1953, plus a sharp 2-year break in cattle prices, caused net incomes to drop to about \$1,100 in 1952 and caused a net loss of \$500 in 1953. Costs, prices, and income per ranch improved slightly in 1954, but the severe drought in 1956 resulted in a

record 20-year low in net ranch income.

Gross ranch production varied from 77 percent of the 1947-49 average in 1956 to 118 percent in 1959. Costs adjusted for changes in price level varied from an index of 92 in 1942 to 125 in 1953. Efficiency of production was indicated by measuring these deflated costs, or inputs, against production, or outputs. Index of production per unit of input ranged from 69 in 1956 to 114 in 1959. Production per unit of output was highest in years of or following favorable weather.

The index of prices received varied from 37 in 1940 to 152 in 1951 (1947-49 = 100). The index of prices paid varied from 46 in 1940 to 130 in 1959.

A summary of organization, production, and related factors for the 20-year period is given in table 1. Table 2 presents investments, receipts, costs, and income on southwestern family-operated cattle ranches for the same period. Essential features of tables 1 and 2 are presented in table 3 on an animal unit basis.

TABLE 1.--Organization, production, and related factors, commercial family-operated cattle ranches, Southwestern Nonmigratory Grazing Area, averages per ranch, 1940-44 and 1945-49, annual 1950-59

Item	Unit	Average		1950	1951	1952	1953	1954	1955	1956	1957	1958	1959 ¹
		1940-44	1945-49										
Land in ranch.....	Acre	7,798	7,910	8,870	8,621	9,605	10,569	10,592	10,610	10,660	11,010	11,090	11,110
Cropland harvested.....	do.	30	27	20	24	26	28	28	29	29	27	25	22
Livestock on ranch Jan. 1:													
Cattle.....	No.	218.3	216.8	218.8	224.2	226.6	225.3	215.8	205.0	203.2	190.3	188.4	212.2
Hogs.....	No.	1.7	2.1	1.8	2.0	3.9	.5	.5	.6	.2	.2	.3	.4
Poultry.....	No.	27.0	29.0	23.0	28.0	28.0	26.0	23.0	24.0	27.0	22.0	20.0	25.0
Horses.....	No.	11.7	11.3	10.9	9.7	8.8	7.2	6.4	6.6	6.4	6.0	5.7	5.5
Livestock production rates:													
Calf crop.....	Pct.	74.3	75.3	79.4	75.6	75.3	80.3	75.3	75.8	75.0	76.0	80.0	82.0
Death loss.....	Pct.	2.6	2.5	1.7	2.3	2.7	2.8	2.7	2.5	3.2	2.5	2.2	2.0
Calf marketing weights..	Lb.	379	371	367	352	346	335	332	348	330	365	408	424
Net turnoff per cow.....	Lb.	368	347	365	342	331	299	324	358	304	345	415	419
Annual precipitation index (1947-49=100).....		143	100	96	88	95	69	95	94	55	127	156	93
Range forage condition index (1947-49=100)...		106	100	102	92	92	90	89	91	81	93	107	103
Cattle condition index (1947-49=100).....		103	100	102	97	97	95	92	96	90	96	105	102
Animal units:													
On ranch Jan. 1.....	No.	189.7	190.7	191.0	194.0	196.5	193.4	186.0	176.1	175.8	165.3	163.8	182.2
Per section of owned and leased lands ²	No.	15.6	15.5	13.8	14.4	13.1	11.7	11.2	10.6	10.6	9.6	9.5	10.5

¹ Preliminary.

² Includes animal units grazed on temporary pasture and leases and grazing permits.

TABLE 2.--Investments, costs and returns, average per ranch, commercial family-operated cattle ranches, Southwestern Nonmigratory Grazing Area, averages per ranch, 1940-44 and 1945-49, annual 1950-59

Item	Average		1950	1951	1952	1953	1954	1955	1956	1957	1958	1959 ¹
	1940-44	1945-49										
Total farm capital	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>
Jan. 1.....	46,110	82,107	117,861	134,187	154,748	148,790	135,906	129,772	130,640	128,910	140,658	157,672
Land and buildings.	32,798	59,449	86,483	91,779	108,235	117,788	108,627	103,898	104,381	105,087	112,562	118,839
Machinery and equipment.....	1,118	1,724	2,671	2,851	3,358	3,968	3,819	3,656	3,595	3,510	3,619	4,218
Livestock.....	10,908	19,008	26,475	37,011	39,618	23,973	20,641	19,734	20,158	18,252	22,478	33,122
Feed and seed.....	1,286	1,926	2,232	2,546	3,537	3,061	2,819	2,484	2,506	2,061	1,999	1,493
Cash receipts.....	5,798	10,630	15,294	18,247	11,941	9,051	9,891	10,025	8,294	11,386	12,599	15,608
Beef cattle.....	5,477	10,257	14,868	17,730	11,279	8,751	9,564	9,335	7,953	10,971	12,133	15,105
Other livestock and livestock products.....	98	159	152	87	282	115	107	191	91	145	166	203
Crops and miscellaneous.....	223	214	274	430	380	185	220	499	250	270	300	300
Cash expenditures....	5,017	7,356	7,952	11,342	11,363	9,815	8,052	7,523	7,205	6,775	8,373	8,953
Feed, including grazing fees.....	1,230	2,284	2,462	4,312	4,728	4,546	3,553	2,460	3,318	1,287	646	1,156
Livestock purchased	823	1,386	1,093	2,416	1,533	955	413	975	713	1,584	2,796	2,187
Other livestock expense.....	29	43	67	82	88	103	96	97	103	112	116	136
Crops.....	6	10	6	7	12	8	8	10	10	13	10	11
Machinery purchased	231	511	643	968	1,121	589	632	711	354	663	1,387	1,326
Other machinery expense.....	446	624	763	815	1,014	1,114	1,166	1,082	926	1,270	1,273	1,367
Ranch buildings and improvements.....	1,168	1,047	1,232	967	938	602	510	530	125	162	450	680
Hired labor.....	560	653	711	795	807	733	546	536	517	483	438	684
Taxes.....	275	453	570	545	671	749	758	750	768	816	895	953
Miscellaneous expenditures.....	249	345	405	435	451	416	370	372	371	385	362	453
Net cash ranch income	781	3,274	7,342	6,905	578	-764	1,839	2,502	1,089	4,611	4,226	6,655
Value of perquisites.	518	697	757	952	953	974	910	883	919	1,067	1,134	1,011
Change in inventory:												
Crops and livestock	59	36	587	987	-751	-168	-1,781	220	-1,993	-70	3,805	637
Machinery and buildings.....	763	363	497	389	354	-531	-645	-589	-1,123	-771	77	15
Net ranch income.....	2,121	4,370	9,183	9,233	1,134	-489	323	3,016	-1,108	4,837	9,242	8,318
Charge for capital...	1,845	3,284	4,714	5,368	6,190	5,952	5,436	5,190	5,226	6,059	7,736	7,884
Return to operator and family labor.	276	1,086	4,469	3,865	-5,056	-6,441	-5,113	-2,174	-6,334	-1,222	1,506	434
Return per hour....	.13	.44	1.87	1.60	-2.04	-2.60	-1.92	-.84	-2.44	-.50	.58	.17

¹ Preliminary.

TABLE 3.--Average income and costs per animal unit, commercial family-operated cattle ranches, Southwestern Nonmigratory Grazing Area, averages per ranch, 1940-44 and 1945-49, annual 1950-59

Item	Unit	Average		1950	1951	1952	1953	1954	1955	1956	1957	1958	1959 ¹
		1940-44	1945-49										
Animal units on ranch Jan. 1.....	Number	189.7	190.7	191.0	194.0	196.5	193.4	186.0	176.1	175.8	165.3	163.8	182.2
Total land.....	Acre	41.11	41.48	46.44	44.44	48.88	54.65	56.95	60.25	60.64	66.61	67.70	60.98
Cropland harvested..	do.	.16	.14	.10	.12	.13	.14	.15	.16	.16	.16	.15	.12
Other land.....	do.	40.95	41.34	46.34	44.32	48.75	54.51	56.80	60.09	60.48	66.45	67.55	60.86
Proportion of cash receipts from beef cattle.....	Percent	94	96	97	97	95	97	97	93	96	97	97	97
Total farm capital, Jan. 1.....	Dollar	243.06	430.55	617.07	691.69	787.52	769.34	730.68	736.92	743.12	779.85	858.72	865.38
Land and buildings..	do.	172.89	311.74	452.79	473.09	550.81	609.04	584.02	589.99	593.75	635.73	687.19	652.24
Machinery and equipment.....	do.	5.89	9.04	13.98	14.70	17.09	20.52	20.53	20.76	20.45	21.23	22.09	23.15
Livestock.....	do.	57.50	99.67	138.61	190.78	201.62	123.95	110.97	112.06	114.66	110.42	137.23	181.79
Feed and seed.....	do.	6.78	10.10	11.69	13.12	18.00	15.83	15.16	14.11	14.26	12.47	12.21	8.20
Total cash receipts...	Dollar	30.56	55.74	80.07	94.06	60.77	46.80	53.18	56.92	47.18	68.88	76.92	85.66
Beef cattle.....	do.	28.87	53.79	77.84	91.39	57.40	45.25	51.42	53.01	45.24	66.37	74.08	82.90
Other livestock and livestock products	do.	.52	.83	.80	.45	1.44	.59	.58	1.08	.52	.88	1.01	1.11
Crops and miscellaneous.....	do.	1.17	1.12	1.43	2.22	1.93	.96	1.18	2.83	1.42	1.63	1.83	1.65
Total cash expenses...	Dollar	26.45	38.57	41.63	58.46	57.83	50.75	43.29	42.72	40.98	40.99	51.12	49.14
Feed, including grazing fees.....	do.	6.49	11.98	12.89	22.23	24.06	23.51	19.10	13.97	18.87	7.79	3.94	6.35
Livestock purchased.	do.	4.34	7.27	5.72	12.45	7.80	4.94	2.22	5.54	4.06	9.58	17.07	12.00
Other livestock expense.....	do.	.15	.22	.35	.42	.45	.53	.52	.55	.58	.68	.71	.75
Crop.....	do.	.03	.05	.03	.04	.06	.04	.04	.06	.06	.08	.06	.06
Machinery purchased.	do.	1.22	2.68	3.37	4.99	5.70	3.05	3.40	4.04	2.01	4.01	8.47	7.28
Other machinery expense.....	do.	2.35	3.28	3.99	4.20	5.16	5.76	6.27	6.14	5.27	7.68	7.77	7.50
Ranch buildings and improvement.....	do.	6.16	5.49	6.45	4.98	4.77	3.11	2.74	3.01	.71	.98	2.75	3.73
Hired labor.....	do.	2.95	3.42	3.72	4.10	4.11	3.79	2.93	3.04	2.94	2.92	2.68	3.75
Taxes.....	do.	1.45	2.38	2.99	2.81	3.42	3.87	4.08	4.26	4.37	4.94	5.46	5.23
Miscellaneous.....	do.	1.31	1.80	2.12	2.24	2.30	2.15	1.99	2.11	2.11	2.33	2.21	2.49
✓ Net cash ranch income.	do.	4.11	17.17	38.44	35.60	2.94	-3.95	9.89	14.20	6.20	27.89	25.80	36.52
Value of perquisites..	do.	2.73	3.65	3.96	4.91	4.85	5.04	4.89	5.01	5.23	6.45	6.92	5.55
Change in inventory: Crops and livestock.	do.	.31	.19	3.07	5.09	-3.82	-.87	-9.57	1.25	-11.34	-.42	23.23	3.50
Machinery and buildings.....	do.	4.02	1.90	2.60	2.00	1.80	-2.75	-3.47	-3.34	-6.39	-4.66	.47	.08
Net ranch income.....	do.	11.17	22.91	48.07	47.60	5.77	-2.53	1.74	17.12	-6.30	29.26	56.42	45.65
Charge for capital....	do.	9.72	17.22	24.68	27.67	31.50	30.78	29.22	29.47	29.73	36.65	47.23	43.27
Return to operator and family labor and management.....	do.	1.45	5.69	23.39	19.93	-25.73	-33.31	-27.48	-12.35	-36.03	-7.39	9.19	2.38

¹ Preliminary.

INTRODUCTION

In the Southwest, where grazing conditions fluctuate widely from season to season, operators of cattle ranches must make many important decisions. In many instances, these decisions will affect operations for a period of years. The relation of cattle prices to ranch operating costs in the Southwest, particularly during droughts, and more intense competition, make sound decisions as to ranch management essential.

This publication is intended to describe ranch organization, costs, and returns on representative cattle ranches in the Southwest and to analyze the data for cattle ranchers and other groups interested in ranching in New Mexico, western Texas, and southern Arizona. Similar studies have been made for sheep in the Southwest, cattle and sheep in the Northern Plains, and cattle in the Intermountain Region. A study of desert-operated sheep ranching in Utah and Nevada is underway.

Data presented for southwestern family-operated commercial cattle ranches include sections on organization, operations, production rates, investments, prices, costs, and returns. Also considered are problems of management and production practices.

A cattle ranch is defined as a range livestock organization which obtains at least 50 percent of the gross income from beef cattle. A commercial family-operated cattle ranch is one in which the management and at least part of the labor required to operate the ranch are furnished by the operator and his family.

Certain other physical and economic characteristics were used to define commercial family-operated units. These other criteria served to eliminate stock farms and ranches with feeding operations. Ranches having large purebred operations were eliminated also, as were ranches whose operators or owners worked off the ranch more than 100 days during the year.

When these criteria were applied to reports of individual cattle ranches, it was found that commercial family-operated cattle ranches in this area included herds of from 80 to 640 head of "all cattle" on January 1.

The average or representative ranch in 1959 had around 215 head of cattle, a little more than 17 sections of land, and a total investment of nearly \$158,000. It required about 3,600 hours of man labor. The investments, costs, and returns described in this study are the averages within that

size range. Throughout the study, this average is referred to as the family-operated cattle ranch.

Table 4 presents the distribution of cattle ranches by numbers of all cattle in the herd January 1, 1940, and value of products produced in 1939 as reported by the 1940 Census of Agriculture. The boxed section includes, for the most part, cattle ranches that meet the criteria of the commercial family-operated units in the study area. This includes approximately 67 percent of all units classified as cattle ranches in this area.

METHODS AND PROCEDURES USED

The methods and procedures used in the study were similar to those used in the series of studies of other types of farms in the major agricultural areas of the United States. Special efforts were made to conduct the study and to present the results in a manner similar to other western ranch studies. However, some of the details of the procedure were necessarily modified to fit the situation peculiar to this area. General procedures as used in other studies in the Costs and Returns series were adhered to.

Sources of Data

One of the most important sources of data was special tabulations of records from the 1940, 1945, 1950, and 1954 Censuses of Agriculture. These tabulations provided benchmarks, or reference points, at 5-year intervals and included many items of physical ranch organization--land use; numbers of livestock by type, class, and age; production rates; investments, costs, and returns. The sample tabulations of cattle ranch records from the 1940 Census of Agriculture consisted of approximately 300 records of commercial family-operated ranches. About 170 of these records were for ranches with herds ranging from 80 to 120 head of all cattle January 1, 1940; 93 for ranches of 280 to 360 head; and 128 for ranches of 400 to 560 head. On the basis of the census enumeration of family-operated ranches, the samples were 70 percent of small ranches, 66 percent of medium-size ranches, and 79 percent of large ranches. The sample of the entire range of ranches, from 80 to 640 head, was 40 percent. Similar tabulations were

TABLE 4.--Numbers of cattle ranches by size of herd, Jan. 1, 1940, and value of products produced in 1939, Southwestern Nonmigratory Grazing Area¹

Value of products produced	Size of herd																				Total ranches	Total family-operated ranches
	Under 40	40-79	80-119	120-159	160-199	200-239	240-279	280-319	320-359	360-399	400-439	440-479	480-519	520-559	560-599	600-639	640-679	680-719	720-over			
Under \$500.....	No. 237	No. 54	No. 6	No. 2	No. 1	---	---	---	No. ---	No. ---	No. ---	No. ---	No. ---	No. ---	No. ---	No. ---	No. ---	No. ---	No. ---	No. 300	No. 0	
\$500-749.....	127	58	11	3	---	1	1	---	---	---	---	---	---	---	---	---	---	---	---	201	16	
\$750-999.....	83	80	20	4	2	2	1	2	---	---	---	---	---	---	---	---	---	---	---	194	31	
\$1,000-1,249.....	57	49	25	6	1	1	1	1	1	1	---	---	---	---	1	---	---	---	---	144	38	
\$1,250-1,499.....	33	49	20	9	1	3	---	---	---	---	---	---	---	---	---	---	---	---	---	115	33	
\$1,500-1,999.....	54	54	44	27	6	9	1	5	1	---	2	1	---	---	---	---	---	---	---	204	96	
\$2,000-2,499.....	30	41	36	31	8	15	7	3	1	---	2	---	---	---	---	---	---	---	---	174	103	
\$2,500-2,999.....	15	13	28	23	12	9	4	3	2	1	2	2	1	---	---	---	---	---	3	118	87	
\$3,000-3,499.....	13	14	14	17	5	11	8	3	1	---	4	---	2	2	---	1	---	---	1	96	68	
\$3,500-3,999.....	7	4	15	9	9	14	3	5	5	1	2	1	1	---	---	---	---	---	5	81	65	
\$4,000-4,999.....	9	5	11	19	15	21	8	16	9	---	5	2	4	---	1	---	---	1	1	127	111	
\$5,000-5,999.....	9	8	7	6	4	20	9	12	6	2	6	2	3	---	---	---	---	---	6	100	77	
\$6,000-6,999.....	1	4	3	6	6	5	8	12	6	4	9	1	7	3	1	1	---	1	3	81	72	
\$7,000-7,999.....	3	3	1	1	2	4	7	8	6	2	8	5	4	6	---	2	---	3	2	67	56	
\$8,000-9,999.....	7	2	5	5	5	6	4	6	6	5	5	4	6	7	6	2	2	2	7	92	72	
\$10,000-11,999...	2	2	2	---	1	2	5	3	5	4	7	4	5	1	4	5	3	2	7	64	48	
\$12,000-13,999...	---	1	1	3	---	---	---	2	3	1	5	2	2	4	1	3	4	5	10	47	0	
\$14,000-15,999...	---	2	1	---	---	2	1	---	---	---	2	3	4	2	2	1	2	1	10	33	0	
\$16,000-17,999...	2	1	1	1	1	---	---	---	2	---	---	---	1	1	1	2	3	1	12	29	0	
\$18,000 and over..	7	2	2	1	---	3	2	4	1	3	4	1	6	---	1	9	4	7	128	185	0	
Total ranches	696	446	253	173	79	128	70	85	55	24	63	28	46	26	18	26	18	23	195	2,452	---	
Total family-operated ranches....	0	0	242	166	77	123	67	79	49	20	52	22	33	19	13	11	0	0	0	---	973	

¹ Includes all farm and ranch units receiving more than 50 percent of gross value of products from the cattle enterprise. Most of the units within the rectangle represent commercial family-operated cattle ranches.

Special tabulation of records from the 1940 U. S. Census of Agriculture.

made, with slightly different sample percentages, of the 1945, 1950, and 1954 Censuses of Agriculture.

Other sources of data were the records of the Crop and Livestock Reporting Service of the Agricultural Marketing Service, USDA, use records of the Forest Service, USDA, and the Bureau of Land Management, U. S. Department of the Interior, detailed field surveys in 1954 and 1957 of approximately 180 ranches, and miscellaneous State and Federal publications.

General Procedure Used

The data on ranch organization from the four census tabulations were adjusted for intercensus years by trends indicated in the tabulations of the annual Rural Carrier and Special Western Livestock surveys of the Crop and Livestock Reporting Services of New Mexico, Texas, and Arizona. The data were supplemented with special calculations of data from a southeastern New Mexico cattle ranch study² and field sur-

veys in 1954 and 1957, which provided added information on physical organization of cattle ranches, production practices, feeding rates, and miscellaneous costs.

After completion of a tentative organization based on the census and on field and rural carrier surveys, checks were made to determine whether this organization reflected conditions on the specific type of ranch in a given year. This was done by working with technicians in the experiment stations and with others who have first-hand knowledge of ranching in the area, by checking the results against other studies, and by survey.

Price data were based on prices received and paid in local areas for specific items. Livestock production rates were obtained from individual ranch reports in the census, rural carrier, and special western sheep surveys of the Statistical Reporting Service, USDA, the field surveys in 1954 and 1957, and miscellaneous State and regional publications.

Various farm-management surveys provided information as to quantities of feed fed to livestock, tax rates, miscellaneous costs, and food consumed by the farm

² Pingrey, H. B. Cattle Ranching in Southeastern New Mexico, N. Mex. Agr. Expt. Sta. Bul. 336, 48 pp., illus. 1948.

family. Because the distribution of ranches by type and size had been summarized by small segments, it was possible to use data obtained for other purposes so long as they could be classified by type and location of farm. The way in which the various census cross-tabulations had been prepared made it relatively easy to sample other data and to weigh results for use in this study. Also, as economic characteristics of ranches in the area were established, it was relatively easy to make field surveys by type and size of ranch that were representative of all ranches.

Data Included

The data for family-operated cattle ranches include annual averages of herd composition by number, age, and sex; land ownership and uses; crop and livestock yields and sales; prices paid and received by ranchers; inventory values; cash and noncash operating costs; mechanization; use of labor; income; and various measures of productivity. Because enterprises other than the cattle enterprise were insignificant in size and number, it was comparatively simple to analyze the cost of producing beef. Also, an attempt was made to determine average net ranch income with both production and the ratios of prices received to prices paid at three different levels. The general operations practiced by cattle ranchers in this southwestern area as obtained in the study are described herein. Based on this factual material, analyses were made which suggest relationships among certain inputs and outputs and factors that affect the various measures of operational success observed in the 1940-59 period.

THE SOUTHWESTERN NONMIGRATORY GRAZING AREA

The Southwestern Nonmigratory Grazing Area is bounded on the east in Texas by the Pecos River, except for a tier of five counties which adjoin the southeastern corner of New Mexico; on the north by the northern edges of Lea, Chaves, Lincoln, Socorro, Sierra, and Grant counties, N. Mex., and the Salt and Gila Rivers of Arizona; on the west by the Santa Cruz River in Arizona; and on the south by the United States-Mexico boundary. A listing of areas in the study would include the

southern High Plains and Trans-Pecos areas of Texas, the Pecos, middle Rio Grande, and Animas valleys of New Mexico, and the eastern Gila and Santa Cruz valleys of Arizona. Because of the arid climate, land in the area is used extensively and almost exclusively for grazing livestock. A few small localized irrigated areas are devoted to crop production. Population is sparse compared with most areas in the United States. Figure 1 illustrates the Southwestern Nonmigratory Grazing Area, and ranch livestock areas in the Inter-mountain and Northern Plains where similar studies have been made or are in process.

The area is almost entirely within the Desert Grass Region. Lying outside this vegetative region is the portion of the area in eastern New Mexico and the adjoining areas of Texas. This northeastern section represents the southern extension of the Shortgrass Region.

Precipitation varies from an average of 8.5 inches in the extreme south-central and western portions of the area to 20 inches in the extreme eastern portion. As may be seen from figure 2, which shows the annual average precipitation in New Mexico, the totals vary greatly from year to year. The 68-year average was approximately 13.8 inches. The average during the 20-year period included in the study was approximately 13 inches.

Land Ownership and Tenure

Land ownership in the area varies from east to west. The Texas portion is owned almost entirely by private individuals and State institutions, although State institutions own less than 10 percent of the land. In New Mexico, the eastern portion is owned either privately or by the State. The central and western portions are largely Federal- or State-owned. Of the area that lies in New Mexico, approximately a fourth is privately owned and the rest is owned by the Federal or State Governments. A larger proportion of the Arizona section of the area is privately owned than is typical of the State as a whole. In the study area, approximately a fifth is State-owned and another fifth is owned by the Federal Government in administered areas of national forests or grazing districts. Probably about an additional fifth is in Indian reservations and unappropriated public domain. The remaining two-fifths are in private ownership.

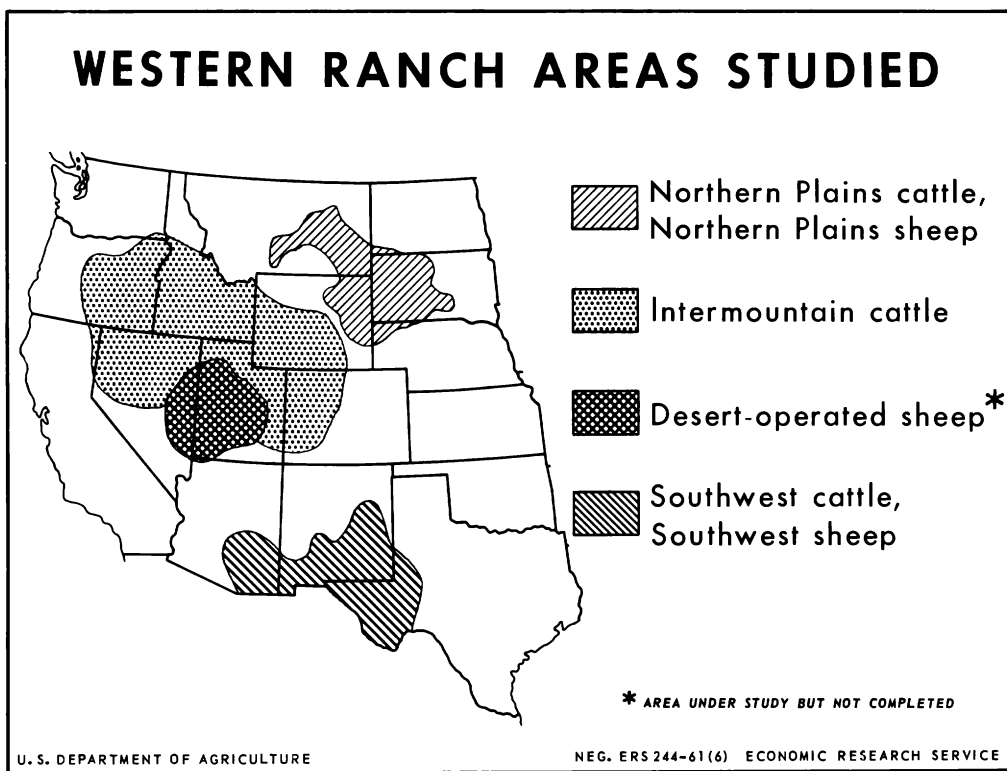


Figure 1

There are four national forests, two grazing districts, three Indian reservations, and four large national parks or monuments in the area. Three large national forests and two large grazing districts border it.

Private individuals are the main class of owners in the area. In this respect, this area differs from other western areas. For the most part, railroad grants were made to the north and outside the study area. The generally low and highly variable productivity of the area discouraged the accumulation of large holdings by insurance companies and banks, the two other main classes of private owners of western ranchlands.

LAND OWNERSHIP AND USE ON FAMILY-OPERATED CATTLE RANCHES

Total land included in family-operated cattle ranches, as measured in both sections and acres, is presented in table 5. The land controlled by the average operator, which includes lands owned and leased but excludes permit land and pastures under short-term temporary lease, fluctuated between 7,000 and 8,000 acres from

1940 to 1946. The size of ranch continued to increase and by 1959 averaged about 11,100 acres.

LIVESTOCK INVENTORY

Practically 100 percent of the cash receipts on these ranches is from the cattle enterprise. From 1940 to 1960, the inventory of cattle on January 1 was comprised of approximately 67 percent beef cows, 9 percent yearlings and 2-year-old replacements, 3 percent steers, 3 percent bulls, 1 percent milk cows, and 17 percent calves (table 6). If a rise in price of beef cattle was in prospect and ranges were good, ranchers attempted to hold back a few calves and thus enlarge their breeding stock. The condition of ranges varied considerably over the period 1940-59, and the proportion of calves in the cattle inventory varied from 15 to 23 percent.

LIVESTOCK MARKETING

According to surveys made on these ranches in 1954 and 1957 and to information

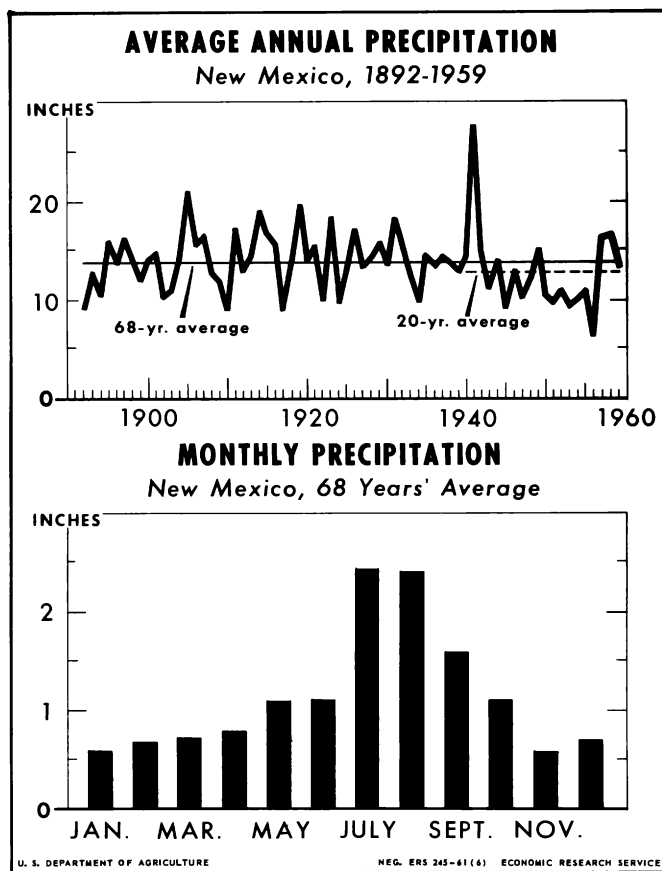


Figure 2

TABLE 5.--Land operated, and use of land owned, average per ranch, commercial family-operated cattle ranches, Southwestern Nonmigratory Grazing Area, averages 1940-44 and 1945-49, annual 1950-59

Year	Land operated				Use of owned land ¹		
	Leased	Owned	Total		Range and pasture-land	Cropland	All other ²
Average:	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Sections</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>
1940-44.....	4,391	3,407	7,798	12.2	3,279	30	98
1945-49.....	4,031	3,879	7,910	12.4	3,790	27	62
1950.....	4,565	4,305	8,870	13.9	4,250	20	35
1951.....	3,763	4,858	8,621	13.5	4,802	24	32
1952.....	3,501	6,104	9,605	15.0	6,050	26	28
1953.....	4,567	6,002	10,569	16.5	5,949	28	25
1954.....	4,592	6,000	10,592	16.6	5,947	28	25
1955.....	4,594	6,016	10,610	16.6	5,961	29	26
1956.....	4,624	6,036	10,660	16.6	5,981	29	26
1957.....	5,105	5,905	11,010	17.2	5,853	27	25
1958.....	5,080	6,010	11,090	17.3	5,960	25	25
1959 ³	5,010	6,100	11,110	17.4	6,053	22	25

¹ Leased land was used exclusively for grazing.

² Headquarters area, roads, lanes, arroyos, and mineral-development areas.

³ Preliminary.

TABLE 6.--Number of livestock per ranch, Jan. 1, commercial family-operated cattle ranches, Southwestern Nonmigratory Grazing Area, averages 1940-44 and 1945-49, annual 1950-59

Year	Cattle								Horses	Hogs	Chickens
	Milk cows and heifers	Beef cows	Beef heifers	Steers	Bulls	Heifer calves	Bull and steer calves	Total			
Average:	Yo.	Yo.	Yo.	Yo.	Yo.	Yo.	Yo.	Yo.	Yo.	Yo.	Yo.
1940-44.....	2.7	140.0	20.0	4.3	7.6	24.6	19.1	218.3	11.7	1.7	27
1945-49.....	2.1	145.8	16.6	7.7	7.5	19.7	17.4	216.8	11.3	2.1	29
1950.....	2.5	143.0	13.6	16.1	7.3	20.4	15.9	218.8	10.9	1.8	23
1951.....	3.0	146.3	19.6	11.7	6.9	20.9	15.8	224.2	9.7	2.0	28
1952.....	2.8	146.3	20.3	15.4	8.3	20.5	13.0	226.6	8.8	3.9	28
1953.....	1.9	151.3	19.2	8.0	7.8	23.7	13.4	225.3	7.2	.5	26
1954.....	2.0	144.5	21.1	4.8	9.0	24.2	10.2	215.8	6.4	.5	23
1955.....	1.5	135.4	22.2	4.1	7.8	22.8	11.2	205.0	6.6	.6	24
1956.....	1.5	139.0	18.6	3.2	8.1	24.2	8.6	203.2	6.4	.2	27
1957.....	1.3	134.0	17.6	1.9	7.9	22.1	5.5	190.3	6.0	.2	22
1958.....	1.0	133.5	16.1	.8	7.6	22.9	6.5	188.4	5.7	.3	20
1959 ¹	1.0	145.5	18.2	6.4	8.0	20.3	12.8	212.2	5.5	.4	25

¹ Preliminary.

from related studies³ made in the area, these ranchers normally market cattle and calves in the late fall, averaging the first week in November. Poor range conditions and lack of feed sometimes force ranchers to sell earlier. In 1956, particularly, ranchers sold most of their cattle at least a month earlier.

In 1953, about 30 percent of the ranchers sold their calves at the ranch, 4 percent sold at auction, 4 percent shipped to a central market, 43 percent sold under contract, usually in the summer, and delivered in the fall, and 19 percent sold under contract for delivery at the ranch. Methods of selling cattle were substantially the same as for calves except that the volume of local auction sales was about twice as high for cattle. Ninety percent of the calves and other cattle sold were delivered by truck.

INVESTMENTS

Major investments on southwestern family-operated cattle ranches are presented in table 7. The investment value in real estate includes all land owned or leased and operated as part of the ranch unit. It excludes land grazed under permit or rented as short-term temporary pasture.

Real Estate and Personal Property Ratios

Total investment per ranch increased from about \$36,000 in 1940 to approximately \$158,000 in 1959, or about 339 percent. Measured in dollars of constant value (1947-49 dollars), the increase in investment per ranch amounted to only 47 percent. The difference in rise between current values and 1947-49 dollar values, 292 percent, can be attributed to changes in the price level.

From 1940 to 1960, investment in real estate ranged from 68 to 81 percent of the total investment on these ranches. The large investment in real estate is explained chiefly by inflated land prices but partly by an increase in size of ranch and partly by range improvements made on family-operated cattle ranches since the 1930's. By 1953, all ranches were fenced and cross-fenced. Existing surface water was developed to provide the maximum quantity of stock water. Where stock water was unavailable, wells were drilled and pumps or windmills were installed to bring water to the surface. Tanks of concrete, steel, or earth were constructed at these sites. Many ranchers have constructed pipelines to carry water from these wells into areas of their ranges where water was previously unavailable. In areas where water runoff is expected, small dams have been thrown across the drainageways.

A summary table is included which presents investments on an animal-unit basis

³ Walrath, A. J. Marketing Cattle in New Mexico, N. Mex. Agr. Expt. Sta. Bul. 360, 29 pp., illus. 1951.

TABLE 7.--Current value of assets, average per ranch Jan. 1, commercial family-operated cattle ranches, Southwestern Nonmigratory Grazing Area, averages 1940-44 and 1945-49, annual 1950-59

Year	Land and buildings			Machinery and equipment			Livestock			Feed and seed	Total ranch investment	Total ranch investment at 1947-49 prices
	Land ¹	Buildings	Total land and buildings	Vehicles	Other machinery and equipment	Total machinery and equipment	Cattle	Other live-stock	Total live-stock			
Average:	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.
1940-44.....	29,294	3,504	32,798	555	563	1,118	10,225	683	10,908	1,286	46,110	93,283
1945-49.....	54,469	4,980	59,449	894	830	1,724	18,304	704	19,008	1,926	82,107	94,200
1950.....	80,359	6,124	86,483	1,392	1,279	2,671	25,909	566	26,475	2,232	117,861	103,253
1951.....	83,713	8,066	91,779	1,501	1,350	2,851	36,466	545	37,011	2,546	134,187	101,451
1952.....	99,314	8,921	108,235	1,784	1,574	3,358	39,021	597	39,618	3,537	154,748	110,867
1953.....	108,542	9,246	117,788	1,891	2,077	3,968	23,523	450	23,973	3,061	148,790	118,875
1954.....	99,567	9,060	108,627	1,807	2,012	3,819	20,185	456	20,641	2,819	135,906	118,925
1955.....	94,743	9,155	103,898	1,848	1,808	3,656	19,266	468	19,734	2,484	129,772	117,152
1956.....	95,403	8,978	104,381	1,823	1,772	3,595	19,701	457	20,158	2,506	130,640	117,784
1957.....	95,570	9,517	105,087	1,871	1,639	3,510	17,811	441	18,252	2,061	128,910	118,743
1958.....	102,850	9,712	112,562	2,035	1,584	3,619	22,074	404	22,478	1,999	140,658	119,348
1959 ²	109,100	9,739	118,839	2,511	1,707	4,218	32,578	544	33,122	1,493	157,672	121,885

¹ Includes both owned and leased lands but excludes lands grazed under grazing permits or short-term pasture-rental arrangements.

² Preliminary.

(table 3). The values in this table conform to the sale values for cattle ranch properties quoted on a "per-cow basis." Essentially, this is real estate value divided by the number of animal units on the ranch. On this basis, investment in land and improvements varied from a low of \$142 per animal unit to a high of \$687 in 1958. This is nearly twice the value on Northern Plains cattle ranches.⁴

Investment in machinery and equipment on cattle ranches in the Southwest is relatively unimportant. In 1959, it amounted to about 3 percent of the total investment.

RANCH PRODUCTION RATES

Production rates of cattle on family-operated ranches in the Southwest are given in table 8. Calf crop percentages, which are based on the number of calves raised per cow 2 years old and older in the herd on January 1, ranged from 71 to 82 percent. Favorable range forage conditions in 1941, 1944, 1949, 1957, and 1958 were responsible for the high calf crops in 1942, 1945, 1950, 1958, and 1959 (fig. 3). The high calf crop in 1953 occurred because of the heavy feeding that took place in 1952-53.

Death losses ranged from 1.7 to 3.2 percent of the average number of cattle (excluding calves) in the herd during the year. These losses coincided with or followed periods of heavy rainfall or severe drought. Apparently a part of the loss in these years was because of the higher percentage of cows calving. Another factor was the invasion of weeds on southwestern ranges during periods of relatively high rainfall. Many of these weeds are poisonous to cattle. Drought caused the higher losses in 1952-54 and 1956.

A common measure of beef production on ranges is the turnoff of live beef per cow in the breeding herd. These values are given in table 9. Turnoff of live beef per cow is a net figure, reflecting the actual quantity of live beef produced on the ranch each year. Yearly total turnoff includes pounds of cattle sold and consumed on the ranch less the weight of cattle bought, plus inventory change in the weight of the herd from January 1 to December 31. The total turnoff divided by the number of cows in the herd 2 years old and over gives the turnoff per cow.

The effects on beef turnoff of the years with relatively favorable moisture--1941, 1946, 1949, 1958, and 1959--can be observed in the table. The effects of the prolonged drought of 1950-56 are apparent also. In this latter period, the turnoff fell 17 percent. However, net turnoff tends to

⁴Gray, J. R. and Baker, C. B. Organization, Costs and Returns on Cattle Ranches in the Northern Great Plains. Mont. Agr. Expt. Sta. Bul. 495, 107 pp., illus. 1953.

TABLE 8.--Cattle production rates, commercial family-operated cattle ranches, Southwestern Nonmigratory Grazing Area, averages 1940-44 and 1945-49, annual 1950-59

Year	All cows 2 years old and over	Calf crop ¹	Death loss ²	Weight per head of animal sold						
				Cows	Steer yearlings		Heifer yearlings		Bulls	Calves
					Short	Long	Short	Long		
Average:	<i>Number</i>	<i>Percent</i>	<i>Percent</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>
1940-44.....	142.3	74.3	2.6	866	533	717	505	660	1,242	379
1945-49.....	147.9	75.3	2.5	866	508	664	475	613	1,260	371
1950.....	145.0	79.4	1.7	912	520	660	483	618	1,302	367
1951.....	148.4	75.6	2.3	888	478	629	455	605	1,287	352
1952.....	149.1	75.3	2.7	902	489	626	464	600	1,259	346
1953.....	152.8	80.3	2.8	886	458	619	450	598	1,263	335
1954.....	146.5	75.3	2.7	903	453	632	428	600	1,351	332
1955.....	136.9	75.8	2.5	909	470	647	463	625	1,360	348
1956.....	140.5	75.0	3.2	900	440	630	420	600	1,350	330
1957.....	135.3	76.0	2.5	922	530	690	515	650	1,460	365
1958.....	134.5	80.0	2.2	958	620	750	587	710	1,350	408
1959 ³	146.5	82.0	2.0	949	652	760	624	720	1,380	424

¹ Calves of weaning age as a percentage of cows 2 years old and over in herd on Jan. 1.

² Death loss as percentage of average number of cattle (excluding calves) in herd during the year.

³ Preliminary.

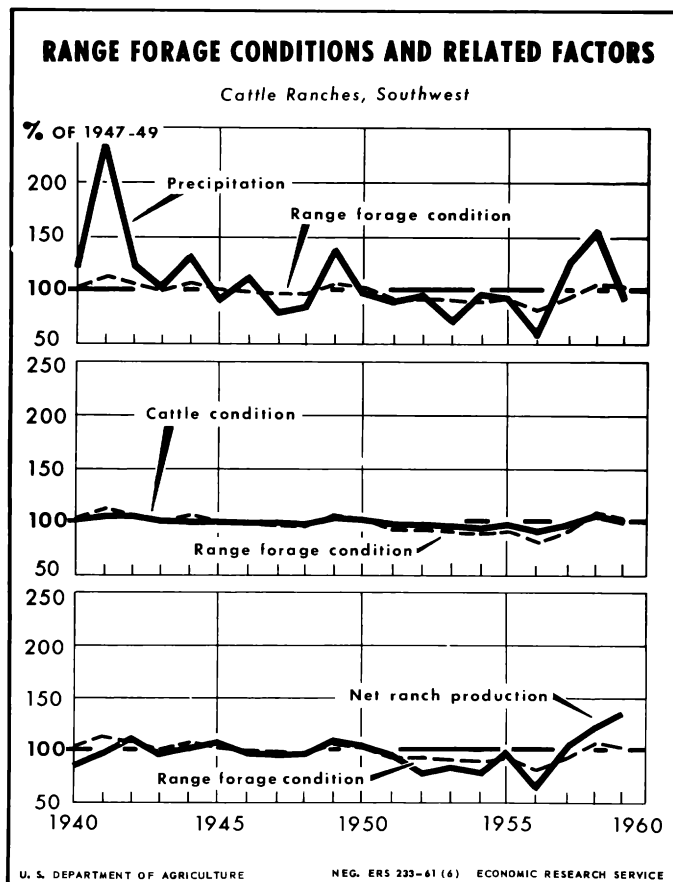


Figure 3

TABLE 9.--Average turnoff of live beef per cow 2 years old and over, commercial family-operated cattle ranches, Southwestern Nonmigratory Grazing Area, averages 1940-44 and 1945-49, annual 1950-59

Year	Average per ranch					Beef cows 2 years old and over in herd	Net turnoff per cow
	Sold	Consumed	Net inventory change	Purchased	Net turnoff		
Average:	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Number</i>	<i>Pounds</i>
1940-44.....	53,643	1,283	2,357	5,704	51,579	140.1	368.2
1945-49.....	57,283	775	-409	7,012	50,637	145.8	347.3
1950.....	52,418	550	-3,470	4,305	52,133	143.0	364.6
1951.....	54,053	664	2,584	7,200	50,101	146.3	342.5
1952.....	51,655	675	714	4,590	48,454	146.3	331.2
1953.....	58,631	1,105	-6,349	8,135	45,252	151.3	299.1
1954.....	57,017	927	-9,806	1,250	46,888	144.5	324.5
1955.....	50,737	1,124	906	4,353	48,414	135.4	357.6
1956.....	52,389	1,026	-7,826	3,375	42,314	139.0	303.7
1957.....	55,664	1,347	-2,020	8,808	46,183	134.0	344.6
1958.....	46,933	1,240	20,271	12,997	55,447	133.5	415.3
1959 ¹	63,630	930	4,797	8,373	60,984	145.5	419.1

¹ Preliminary.

lag in years of favorable moisture. Turn-off in 1942, 1950, and 1959 was higher than in 1941, 1949, and 1958, years of favorable precipitation.

Table 10 presents herd dispositions per ranch from 1940 to 1959. Cattle purchases were larger than on family-operated ranches in the Northern Plains. A few heifer calves or breeding cows and heifers were bought each year, except for 1956. Also, bulls were bought in each year of the study. The four main classes of mature or semimature animals, including cows, heifers, steers, and bulls, were sold in each year of the study.

On the basis of total weight sold, sales of calves made up about 49 percent of total sales, yearlings 20 percent, and mature cattle 31 percent (table 11). By this measure, sales of calves increased by 13 percent from 1940-44 to 1950-59. Sales of yearlings dropped 32 percent, and sales of mature cattle gained 7 percent.

Crop Production Rates and Practices

Crop acreages and yields on family-operated cattle ranches from 1940 to 1959 are given in table 12. Crops grown on these cattle ranches consisted almost entirely of small acreages of sorghums and corn grown primarily for forages.

A common measure of forage production from rangelands is the annual units of livestock grazed on these lands during the year. An annual unit of grazing is defined

as the quantities of feed or forage necessary to maintain a 1,000-pound cow and her calf for a year.⁵

The distribution of forage production by months (AUM) of grazing and feeding on family-operated cattle ranches, classified according to land use, is given in table 13. In the New Mexico and Arizona part of the area, public range permits are an important part of the total forage supply. In the Texas portion, short-term temporary pasture rentals are common.

In 1949, approximately 58 percent of the operators of family-operated cattle ranches had grazing permits. Tabulations of the use records of the U. S. Forest Service and the Bureau of Land Management, Department of the Interior, for this area indicated that 44 percent of the total use of public range permits on family-operated cattle ranches was from national forests and 56 percent was from grazing districts. The average number of animals per forest permit declined by 24 percent from 1940 to 1959; the average number of animals per grazing district permit declined 25 percent during the same period. Forest Service permits were issued usually for a specified

⁵Cattle in the Southwest are generally lighter in weight and smaller in size than other western cattle. To compensate for this difference, a formula was used to adjust southwestern cattle to the standard 1,000-pound animal. (Formula used was the ratio of 2/3 power of actual body weight to 2/3 power of 1,000.) For further discussion of animal units, see Stoddart, L. A. and Smith, A. D., Range Management, pp. 161 and 162, New York, 1943. The values used in this study are given in table 10, footnote 1.

TABLE 10.--Cattle production per ranch, commercial family-operated cattle ranches, Southwestern Nonmigratory Grazing Area, averages 1940-44 and 1945-49, annual 1950-59

Year	Begin- ning inven- tory	Calves raised	Purchased			Sold					Died			Slaughtered		Ending inven- tory
			Calves	Cows and heif- ers	Bulls	Calves	Cows	Heif- ers	Steers	Bulls	Cows	Bulls	Heif- ers and steers	Cattle	Calves	
Average:	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
1940-44..	218.3	105.6	3.2	3.3	2.1	63.2	16.1	5.3	18.0	1.9	3.0	0.4	2.4	1.1	1.5	219.6
1945-49..	216.8	111.4	2.5	4.9	2.4	73.3	18.1	6.1	15.0	1.9	2.7	.5	2.1	.8	.8	216.7
1950.....	218.8	115.1	.8	3.5	1.4	77.8	8.4	2.9	19.7	1.7	1.4	.1	2.3	.5	.6	224.2
1951.....	224.2	112.2	2.0	4.8	2.9	78.6	16.9	5.0	11.3	1.4	3.1	.1	2.0	1.0	.1	226.6
1952.....	226.6	106.3	1.4	3.2	1.7	68.4	11.7	6.0	20.8	1.7	2.4	.5	.9	.7	.8	225.3
1953.....	225.3	122.7	2.7	1.2	1.7	86.8	19.7	6.0	16.0	.5	5.8	0	.5	1.0	1.5	215.8
1954.....	215.8	110.3	0	.6	.8	75.6	27.3	.9	9.6	1.6	4.0	.4	1.3	1.1	.7	205.0
1955.....	205.0	107.9	0	.3	3.0	74.1	15.4	3.2	10.8	2.2	3.5	.5	1.1	1.2	1.0	203.2
1956.....	203.2	105.4	0	0	2.5	76.6	19.7	5.0	8.7	2.3	4.1	.4	1.8	1.0	1.2	190.3
1957.....	190.3	102.8	3.5	3.1	3.2	71.6	19.6	6.8	5.9	3.1	1.9	.4	2.4	1.0	1.8	188.4
1958.....	188.4	107.6	0	11.2	3.5	73.3	10.1	3.9	1.9	2.8	3.0	.3	1.0	1.0	1.2	212.2
1959 ¹	212.2	120.1	0	5.3	3.2	84.5	13.6	4.2	12.3	2.7	2.1	.3	1.9	1.0	.4	217.8

¹ Preliminary.

TABLE 11.--Distribution of total weight of cattle sold by age groups, commercial family-operated cattle ranches, Southwestern Nonmigratory Grazing Area, averages 1940-59

Period	Calves	Yearlings	Mature cattle	Total
	Percent	Percent	Percent	Percent
1940-44.....	45	25	30	100
1945-49.....	48	21	31	100
1950-59 ¹	51	17	32	100
1940-59.....	49	20	31	100

¹ 1959 preliminary.

TABLE 12.--Harvested acreage, yield, and production of fodder, averages per ranch, commercial family-operated cattle ranches, Southwestern Nonmigratory Grazing Area, 1940-44 and 1945-49, annual 1950-59

Year	Irrigated cropland						Nonirrigated cropland-- sorghum			Total production		
	Corn fodder			Sorghum fodder			Acreage	Yield	Production	Harvested	Grazed	Total
	Acreage	Yield	Production	Acreage	Yield	Production						
Average:	Acre	Tons	Tons	Acre	Tons	Tons	Acre	Tons	Tons	Tons	Tons	Tons
1940-44...	5.2	3.4	17.8	0.9	2.9	2.6	17.4	0.7	13.1	15.4	18.1	33.5
1945-49..	4.6	3.3	15.2	3.2	2.8	8.8	12.8	.7	8.9	17.8	15.2	33.0
1950.....	3.2	3.1	9.9	4.9	2.7	13.2	10.7	.8	8.6	21.8	9.9	31.7
1951.....	1.6	3.2	5.1	6.8	2.7	18.4	10.8	.8	8.6	27.0	5.1	32.1
1952.....	2.4	3.3	7.9	5.7	2.8	16.0	10.2	.7	7.1	23.1	7.9	31.0
1953.....	2.5	3.7	9.2	5.0	3.2	16.0	9.5	.7	6.6	22.6	9.2	31.8
1954.....	2.5	3.8	9.5	5.0	3.4	17.0	9.5	.7	6.6	23.6	9.5	33.1
1955.....	3.0	4.2	12.6	6.4	3.7	23.7	11.6	.8	9.3	33.0	12.6	45.6
1956.....	3.0	3.5	10.5	6.4	2.5	16.0	8.6	.6	5.2	21.2	10.5	31.7
1957.....	1.0	4.0	4.0	9.8	2.8	27.4	9.2	1.2	11.0	38.4	4.0	42.4
1958.....	.8	3.9	3.1	9.7	2.7	26.2	8.5	1.1	9.4	35.6	3.1	38.7
1959 ¹	1.2	4.0	4.8	10.0	2.7	27.0	4.8	1.0	4.8	36.6	4.8	41.4

¹ Preliminary.

TABLE 13.--Animal unit months of grazing, per ranch by type and ownership of land, commercial family-operated cattle ranches, Southwestern Nonmigratory Grazing Area, averages 1940-49, annual 1950-59

Year	[AUM's of] Feed and forage land							Percentage distribution				
	Total ¹	Owned land			Leased range	Temporary pasture rental	Public range permit	Total	Owned land	Leased range	Temporary pasture rental	Public range permit
		Range	Crop	Total								
Average:	AUM	AUM	AUM	AUM	AUM	AUM	AUM	Percent	Percent	Percent	Percent	Percent
1940-44...	2,277	542	133	675	700	85	816	100	29	31	4	36
1945-49..	2,288	622	102	724	643	192	729	100	32	28	8	32
1950.....	2,292	626	82	708	664	225	695	100	31	29	10	30
1951.....	2,328	566	83	649	440	539	700	100	28	19	23	30
1952.....	2,358	779	96	875	446	337	700	100	37	19	14	30
1953.....	2,321	762	103	865	579	195	682	100	37	25	9	29
1954.....	2,232	707	108	815	542	205	670	100	37	24	9	30
1955.....	2,113	695	68	763	531	159	660	100	36	25	8	31
1956.....	2,110	681	107	788	522	150	650	100	37	25	7	31
1957.....	1,984	662	63	725	574	21	664	100	37	29	1	33
1958.....	1,966	666	66	732	563	21	650	100	37	29	1	33
1959 ²	2,186	766	86	852	629	60	645	100	39	29	3	29

¹ To convert livestock numbers to animal unit months, dairy cows and bulls were considered to be 1.2 animal units, cows 2 years old and older 0.91 animal units, yearling heifers 0.67 animal units, yearling steers 0.68 animal units, and horses 1.0 animal units. Average number of animal units per ranch multiplied by 12 gives the number of animal unit months per ranch.

² Preliminary.

number of stock to graze over a 12-month period at lower elevations and 6 or 7 months at higher elevations. Grazing district permits generally averaged larger than Forest Service permits and were issued for a 12-month period.

PRICES AND VALUES

Prices paid and received by cattle ranch operators in the Southwest are given in tables 14 and 15, respectively. Index numbers of prices received are shown in figure 4. Prices paid for the items listed in table 14 are monthly prices reported in the area weighted by monthly purchases of livestock and feed. Prices received for items sold (table 15) are average prices received at specific points or in counties or areas in the study weighted by months in which the majority of sales were made. Prices received for beef cattle and calves are average prices from September through December.

Inventory values of the major types of feed purchased by southwestern range livestock producers are given in table 16. These values are based on the December 15 prices reported in the three-State area.

CASH, GROSS, AND NET RANCH INCOME

Almost 100 percent of the ranch income is from the sale of cattle and calves (table 17). Sales of other livestock and livestock products, including horses, hogs, milk, chickens, and eggs, amounts to about 1 percent of total sales. Sales of crops are uncommon, and although they varied from no sales to 3 percent, they were less than 0.5 percent of total sales in 8 of the 20 years studied.

These percentages in dollar terms are given in table 18. Total cash income varied from \$3,985 in 1940 to \$18,247 in 1951. In addition to this cash income, perquisites, or the value of products raised and consumed on the ranch, plus a nominal rental value for the ranch dwelling, ranged from \$451 in 1940 to \$1,134 in 1958. The quantity of food items grown and consumed on ranches has decreased in recent years because the size of family has declined and because foods in packaged form are more readily available to ranchers. However, the rise in food prices has caused values of perquisites to more than double since 1940.

Annual changes in inventories of feed and livestock varied only slightly from 1940 to 1947. However, the droughts in the

TABLE 14.--Average prices paid for livestock, feed, and seed, commercial family-operated cattle ranches, Southwestern Nonmigratory Grazing Area, averages 1940-44 and 1945-49, annual 1950-59

Year	Feed				Livestock per head							Seed per cwt.	
	Hay per ton ¹	Grain per cwt. ²	Protein concentrate per ton	Minerals per cwt.	Cows	Heifers and steers	Calves	Bulls	Hogs	Baby chicks	Horses	Corn ³	Sorghum ⁴
Average:	<i>Dol.</i>	<i>Dol.</i>	<i>Dol.</i>	<i>Dol.</i>	<i>Dol.</i>	<i>Dol.</i>	<i>Dol.</i>	<i>Dol.</i>	<i>Dol.</i>	<i>Dol.</i>	<i>Dol.</i>	<i>Dol.</i>	<i>Dol.</i>
1940-44...	17.12	2.13	53.80	0.89	52	38	27	232	21.87	0.14	66	5.76	3.11
1945-49..	27.52	3.41	87.40	1.24	91	71	50	316	45.69	.20	63	9.69	6.14
1950.....	30.10	3.35	92.00	1.45	100	97	70	481	39.79	.18	55	9.60	4.47
1951.....	42.57	2.92	100.00	1.56	180	131	91	504	49.81	.19	53	10.86	3.09
1952.....	44.12	3.95	104.00	1.59	145	142	98	520	46.75	.23	52	12.06	9.41
1953.....	38.31	2.69	78.00	1.67	93	92	64	380	37.43	.20	57	8.00	3.00
1954.....	38.56	3.08	84.00	1.64	97	78	53	350	54.40	.20	68	9.00	7.00
1955.....	32.00	2.53	75.00	1.67	98	80	55	300	40.20	.20	70	10.00	7.20
1956.....	35.50	2.72	80.00	1.70	100	84	60	280	32.00	.22	70	9.25	6.50
1957.....	25.60	2.33	76.00	1.76	95	82	59	320	28.00	.24	73	10.00	8.50
1958.....	22.00	2.15	68.00	1.78	140	120	65	380	30.00	.25	70	9.75	6.38
1959 ⁵	24.31	2.24	76.00	1.89	175	140	80	400	42.00	.23	95	10.00	8.16

¹ Alfalfa hay.

² Oat, barley, and corn prices weighted by quantities bought each year.

³ Open-pollinated corn.

⁴ Hegari sorghum.

⁵ Preliminary.

TABLE 15.--Prices received for crops and livestock sold, commercial family-operated cattle ranches, Southwestern Nonmigratory Grazing Area, averages 1940-44 and 1945-49, annual 1950-59

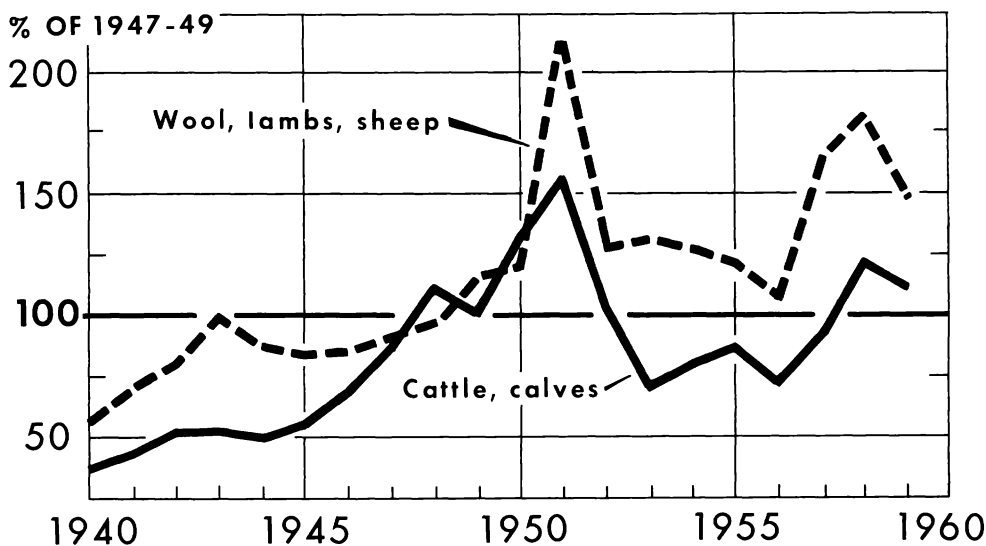
Year	Roughages per ton ¹	Livestock					Livestock products	
		Calves per cwt.	Beef cattle per cwt.	Hogs per cwt.	Horses per head	Poultry per pound	Eggs per dozen	Butterfat per pound
Average:	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>
1940-44...	10.45	11.40	9.09	10.87	66	0.19	0.28	0.39
1945-49..	19.51	20.15	16.14	20.31	63	.27	.44	.61
1950.....	19.26	31.86	24.18	19.34	55	.25	.38	.56
1951.....	30.00	39.00	26.30	19.37	53	.26	.49	.65
1952.....	30.49	26.28	18.08	18.27	52	.22	.45	.66
1953.....	25.00	16.85	13.03	21.93	57	.22	.52	.62
1954.....	24.90	19.83	14.37	18.80	68	.17	.42	.54
1955.....	21.00	20.72	16.00	14.86	70	.18	.47	.53
1956.....	26.00	17.38	13.13	15.29	70	.16	.43	.54
1957.....	20.00	22.83	16.95	17.01	73	.15	.43	.55
1958.....	15.00	27.94	22.18	18.60	70	.15	.40	.60
1959 ²	14.00	25.91	20.94	12.85	95	.13	.36	.54

¹ Sorghum forage.

² Preliminary.

PRICES RECEIVED FOR CATTLE, SHEEP, AND WOOL

Cattle Ranches, Southwest



U. S. DEPARTMENT OF AGRICULTURE

NEG. ERS 234-61 (6) ECONOMIC RESEARCH SERVICE

Figure 4

TABLE 16.--Inventory prices of livestock and feed, commercial family-operated cattle ranches, Southwestern Nonmigratory Grazing Area, averages 1940-44 and 1945-49, annual 1950-59

Year	Livestock per head											Feed		
	Milk cows	Beef cows	Heifers 1 year and over	Steers 1 year and over	Bulls 1 year and over	Calves	Hogs, months and over	Colts, 1 to 3 years	Draft horses	Saddle horses	Chickens	Grain, per cwt. ¹	Roughages per ton ²	Protein concentrates per cwt.
Average:	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.
1940-44..	63	51	38	43	101	27	17	31	46	66	0.82	1.16	14.40	2.59
1945-49..	113	90	70	78	184	50	34	30	43	63	1.33	2.28	25.53	4.27
1950.....	164	128	97	107	232	70	29	22	32	55	1.49	1.84	23.92	4.50
1951.....	212	180	131	139	312	91	41	22	28	53	1.44	1.90	30.79	4.90
1952.....	227	184	142	155	351	98	36	21	27	52	1.47	2.59	45.72	5.10
1953.....	162	109	92	99	238	64	34	24	26	57	1.23	2.93	44.25	3.80
1954.....	150	97	78	82	222	53	48	26	25	68	1.26	2.29	29.00	4.10
1955.....	142	98	80	84	230	55	31	30	27	70	1.10	2.20	29.92	4.85
1956.....	143	100	84	86	220	60	27	32	29	70	1.12	1.64	27.34	4.60
1957.....	142	95	82	87	210	59	24	35	30	73	1.08	2.15	33.97	4.85
1958.....	170	123	106	110	234	65	26	32	27	70	1.10	1.75	30.00	3.50
1959 ³	200	165	138	144	286	80	35	48	35	95	1.10	1.40	20.00	3.60

¹ Sorghum grain price at end of preceding year.

² Alfalfa hay price at end of preceding year.

³ Preliminary.

TABLE 17.--Sources of income, commercial family-operated cattle ranches, Southwestern Nonmigratory Grazing Area, averages 1940-44 and 1945-49, annual 1950-59

Year	Total gross cash income	Cash income from--			
		Sales of beef cattle	Sales of other livestock	Sales of crops	Government payments
Average:	Percent	Percent	Percent	Percent	Percent
1940-44.....	100	94	2	(¹)	4
1945-49.....	100	96	2	(¹)	2
1950.....	100	97	1	1	1
1951.....	100	97	(¹)	2	1
1952.....	100	95	2	2	1
1953.....	100	97	1	1	1
1954.....	100	97	1	1	1
1955.....	100	93	2	3	2
1956.....	100	96	1	0	3
1957.....	100	97	1	0	2
1958.....	100	97	1	0	2
1959 ²	100	97	1	0	2

¹ Less than 0.5 percent.

² Preliminary.

TABLE 18.--Average cash, gross, and net ranch incomes per ranch, commercial family-operated ranches, Southwestern Nonmigratory Grazing Area, average 1940-44 and 1945-49, annual 1950-59

Year	Cash sales				Government payments	Total cash income	Ranch perquisites	Feed and livestock inventory change	Gross ranch income	Total ranch expenses	Net ranch income
	Beef cattle	Other livestock and livestock products	Crops and miscellaneous	Total							
Average:	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
1940-44....	5,477	98	11	5,586	212	5,798	518	59	6,375	4,254	2,121
1945-49...	10,257	159	43	10,459	171	10,630	697	36	11,363	6,993	4,370
1950.....	14,868	152	116	15,136	158	15,294	757	587	16,638	7,455	9,183
1951.....	17,730	87	276	18,093	154	18,247	952	987	20,186	10,953	9,233
1952.....	11,279	282	241	11,802	139	11,941	953	-751	12,143	11,009	1,134
1953.....	8,751	115	70	8,936	115	9,051	974	-168	9,857	10,346	-489
1954.....	9,564	107	80	9,751	140	9,891	910	-1,781	9,020	8,697	323
1955.....	9,335	191	319	9,845	180	10,025	883	220	11,128	8,112	3,016
1956.....	7,953	91	0	8,044	250	8,294	919	-1,993	7,220	8,328	-1,108
1957.....	10,971	145	0	11,116	270	11,386	1,067	-70	12,383	7,546	4,837
1958.....	12,133	166	0	12,299	300	12,599	1,134	3,805	17,538	8,296	9,242
1959 ¹	15,105	203	0	15,308	300	15,608	1,011	637	17,256	8,938	9,318

¹ Preliminary.

mid-1950's caused considerable liquidation of livestock numbers, and inventory changes were substantial, ranging from a decrease of nearly \$2,000 in 1956 to an increase of around \$3,800 in 1958.

Gross ranch income is the sum of cash sales, Government payments, ranch perquisites, and net change in inventory value of feed and livestock. This term, which includes cash and noncash income, is commonly used to measure total ranch production and also comparative size or scale of ranch operations. However, gross ranch income alone as a measure of size and

efficiency can be misleading. From 1940 to 1942, gross ranch income increased by 63 percent (fig. 5). However, prices received for cattle increased by 41 percent during this period. Total expenses increased by only 31 percent. As a result, net ranch income, which is the return realized by the operator and his family for their labor, management, and capital, rose 142 percent from 1940 to 1942. Gross income, however, fell 51 percent from 1951 to 1953. Total expenses fell only 6 percent during this period. Net ranch income declined sharply (105 percent) from 1951 to

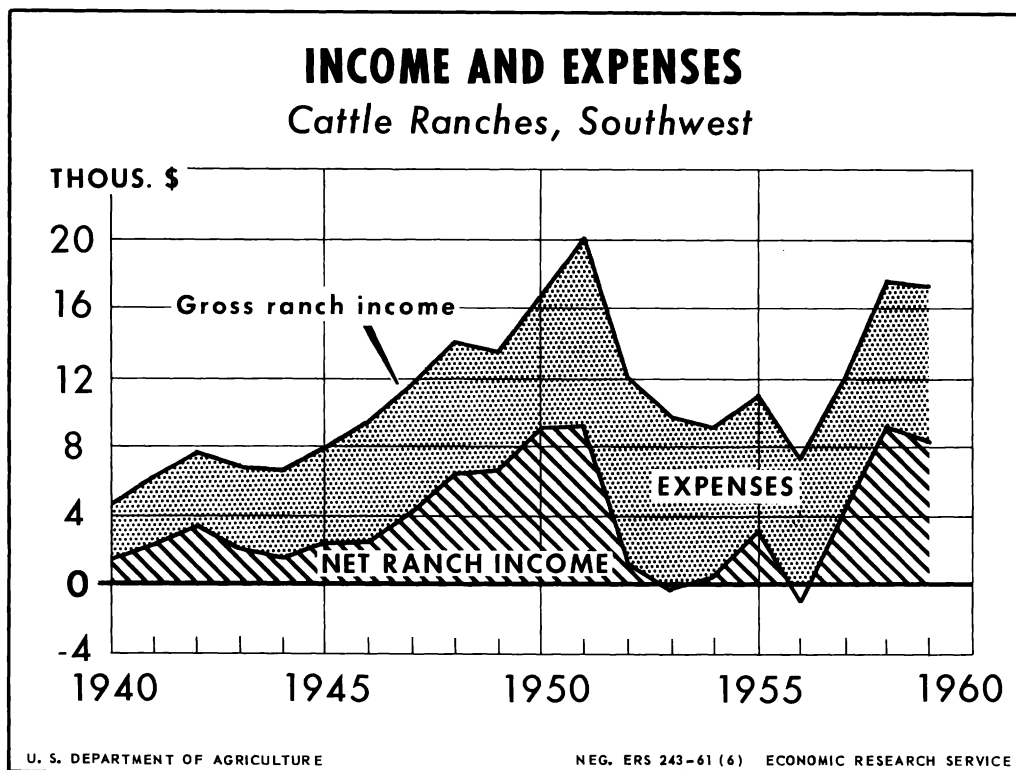


Figure 5

1953. A net loss resulted when receipts dropped sharply and expenses were reduced only slightly. Price increases for livestock and favorable range conditions accounted for the sharp net ranch income gains in 1957 and 1958.

PRODUCTION COSTS

Cash costs of production are divided into 10 major categories: feed including grazing fees; livestock purchases; other livestock expense; crop expense; machinery purchases; other machinery expense; ranch building and improvement expense; hired labor costs; taxes; and miscellaneous expenditures. Total expenditures for each group are given in table 19.

Feed purchases include expenditures for hay, grain, protein concentrates, salt, other minerals, and grazing fees. Small quantities of hay were bought each year for milk cows, horses, and the hospital herd. Ranchers also bought feed grains for these classes of stock and for chickens. Extremely large outlays occurred in 1951-54. In these years, cattle were fed heavy rations of protein concentrates to maintain them during the drought.

Expenditures for livestock consist of small numbers of cattle bought each year. (See table 10.) Occasionally a horse or milk cow was purchased. As the drought eased in 1957-58, ranchers bought more than the ordinary number of breeding stock for their restocking programs. Other livestock expenditures were mainly for vaccines and medicine.

Crop expense was very small on southwestern family-operated cattle ranches. A little corn, sorghum, and grass seed was bought in most years of the study period.

Machinery expense includes new purchases and replacement costs of trucks, tractors, ranch share of the automobile, and other machinery. Expenditures relating to the ranch pickup are the chief items in this category.

Other machinery expense includes operation and repair costs for the above items of machinery and equipment. Here again, the ranch pickup was the main item of cost.

Expenditures for ranch buildings, fences, wells, ponds, and other improvements were substantial during most years of the study. In the earlier period from 1940 to 1942, they were the largest single item of expense.

TABLE 19.--Cash expenditures per ranch for selected groups of items, commercial family-operated cattle ranches, Southwestern Nonmigratory Grazing Area, averages 1940-44 and 1945-49, annual 1950-59

Year	Feeds, including grazing fees	Livestock purchased	Other livestock expense	Crop	Machinery purchased	Other machinery expense	Ranch buildings and improve- ments	Hired labor	Taxes	Miscel- laneous expendi- tures	Total cash expenses
Average:	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>
1940-44..	1,230	823	29	6	231	446	1,168	560	275	249	5,017
1945-49..	2,284	1,386	43	10	511	624	1,047	653	453	345	7,356
1950.....	2,462	1,093	67	6	643	763	1,232	711	570	405	7,952
1951.....	4,312	2,416	82	7	968	815	967	795	545	435	11,342
1952.....	4,720	1,533	88	12	1,121	1,014	938	807	671	451	11,363
1953.....	4,546	955	103	8	589	1,114	602	733	749	416	9,815
1954.....	3,553	413	96	8	632	1,166	510	546	758	370	8,052
1955.....	2,460	975	97	10	711	1,082	530	536	750	372	7,523
1956.....	3,318	713	103	10	354	926	125	517	768	371	7,205
1957.....	1,287	1,584	112	13	663	1,270	162	483	816	385	6,775
1958.....	646	2,796	116	10	1,387	1,273	450	438	895	362	8,373
1959 ¹	1,156	2,187	136	11	1,326	1,367	680	684	953	453	8,953

¹ Preliminary.

Expenditures for hired labor on family-operated cattle ranches in most years were moderate and relatively constant in proportion to total expenses. Labor costs were relatively high only from 1942 through 1945.

Taxes consisted chiefly of real estate taxes, with a smaller proportion made up of personal property taxes. Although relatively small when compared with total expense, taxes were an important item because they were less flexible than many other items of expenditures; and they have increased constantly since 1951.

Miscellaneous expenditures included the cost of telephone and electricity chargeable to the ranch enterprise, association fees, livestock journals, insurance on equipment, vehicles, and ranch service buildings, legal and bookkeeping fees, and board for hired labor. These expenditures have been only a small portion of the total expense.

Total cash expenditures varied from about \$4,300 in 1941 to about \$11,300 in 1952. Cash expenditures mounted gradually from 1941 to 1950 and increased sharply in 1951. From the high plateau in 1951 and 1952, cash expenditures were cut sharply until in 1954 they were at the 1950 level. Since 1954, cash expenditures have been held at about the \$7,000 to \$9,000 level.

Feed and Grazing Fee Costs

Feeding rates used to compute the annual feeding requirements for the various types of livestock are given in table 20. Feeding

rates were adjusted annually, based on data obtained from various surveys and publications.

Ranchers in the area raise very little of their feed. They buy most of the hay as well as all of the protein concentrate and grain used. Although there has been a general tendency toward a shift in feeding rates per animal, drought seems to change these rates materially from time to time. During the earlier part of the period, horses were fed 1,100 pounds of grain and 1.8 tons of hay. They were fed more than half of all grain and a fourth of all hay fed on these ranches. By 1954, they were fed only 760 pounds of grain and 0.2 tons of hay per head and they used only a third of all grain and less than a tenth of all hay. One of the more pronounced changes was in the protein concentrate ration fed to beef cows. In the early forties, less than 50 pounds was fed per cow. This amount generally increased and in the early fifties, cows were fed as much as 330 pounds.

However, with improved range conditions in the late fifties, the ration was reduced and in 1957-59, it averaged about 55 pounds per head. Most of the increase in cost of feed resulted from increased purchases of protein concentrates, the most popular form being cottonseed cake and meal (table 21). Cake or meal fed in the earlier period of the study was usually 41 to 43 percent protein. In the last few years, concentrates with a lower percentage of protein have become popular.

TABLE 20.--Feeding rates per unit of livestock, commercial family-operated cattle ranches, Southwestern Nonmigratory Grazing Area, averages 1940-44 and 1945-49, annual 1950-59

Year	Hay fed per head							Protein concentrates fed per head			
	Milk cows	Dairy heifers	Beef cows	Beef bulls	Weaned calves	Other cattle	Horses	Milk cows	Beef cows	Beef bulls	Other cattle
Average:	<i>Tons</i>	<i>Tons</i>	<i>Tons</i>	<i>Tons</i>	<i>Tons</i>	<i>Tons</i>	<i>Tons</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>
1940-44.....	2.9	0.75	0.19	0.9	0.04	0.06	1.67	360	44	114	32
1945-49.....	2.8	.75	.15	.9	.03	.06	1.06	396	91	137	37
1950.....	3.0	.70	.10	1.0	.02	.05	.80	400	120	150	40
1951.....	3.0	.70	.12	1.0	.02	.06	.50	415	190	150	60
1952.....	3.0	.70	.15	1.0	.02	.06	.30	465	240	170	80
1953.....	3.0	.70	.20	1.0	.02	.06	.20	500	320	200	80
1954.....	3.0	.70	.21	1.0	.03	.06	.20	490	330	220	85
1955.....	3.0	.65	.12	1.0	.02	.05	.20	480	190	160	50
1956.....	3.0	.70	.30	1.0	.03	.15	.20	490	320	220	85
1957.....	3.0	.55	.10	1.0	.02	.05	.40	450	75	125	30
1958.....	3.0	.60	.11	1.0	.02	.05	.60	420	45	125	25
1959 ¹	3.0	.65	.15	1.0	.03	.06	.65	400	42	125	25
	Grain fed per head									Grain fed per cwt. hogs produced	
	Milk cows	Dairy heifers	Beef cows	Beef bulls	Weaned calves	Other cattle	Horses	Chickens on ranch Jan. 1	Chickens raised to 6 months		
Average:	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>
1940-44.....	360	23	15.2	105.0	19.2	5.4	1,040	51	15	424	
1945-49.....	396	27	10.0	83.0	19.8	5.2	924	67	17	442	
1950.....	400	30	5.0	75.0	20.0	2.0	880	78	20	455	
1951.....	415	30	6.0	80.0	23.0	3.0	840	78	20	455	
1952.....	465	30	7.0	90.0	25.0	4.0	820	78	20	450	
1953.....	500	30	15.0	100.0	35.0	10.0	800	78	20	450	
1954.....	480	30	12.0	95.0	35.0	8.0	760	78	20	440	
1955.....	480	30	8.0	80.0	22.0	3.0	780	78	20	460	
1956.....	500	30	20.0	105.0	35.0	10.0	780	78	20	460	
1957.....	420	20	5.0	60.0	16.0	3.0	780	78	20	460	
1958.....	440	20	10.0	60.0	18.0	4.0	780	78	20	460	
1959 ¹	460	22	10.0	65.0	20.0	5.0	790	78	20	460	

¹ Preliminary.

Cash outlays for feed and grazing fees were the largest single cash expense on these cattle ranches. The minimum percentage was 8 percent of total expenses in the relatively favorable year of 1958, and the maximum percentage was 46 percent in the unfavorable years of 1953 and 1956. Over the period, the cost of feeds and grazing fees was 30 percent of total expenses.

Livestock Expenditures

Livestock expenditures consisted almost entirely of livestock purchases. Small amounts, usually less than \$100, were spent on livestock medicines, vaccines, and sprays. Until 1949, veterinary supplies cost less than \$50 per annum. They reached a peak of \$136 in 1959.

Two or more bulls were bought in 13 of the 20 years of the study period. At least one bull was bought each year, except in 1954. Calves were bought every year from 1940 through 1953. Since 1953, calves have been bought in only one year, 1957.

The number of calves bought ranged from none in 5 years to 5.4 head in 1942. Actually, few ranchers bought calves. Cows and heifers were bought in most years of the study, ranging from none in 1956 to 11.2 head in 1958. Total amounts spent for livestock varied from \$413 in 1954 to \$2,796 in 1958. This cash expense varied considerably from year to year.

The veterinary supply cost per head varied from 20 to 25 cents from 1940 to 1944, 26 to 50 cents from 1945 to 1949, 50 to 82 cents from 1950 to 1954, and 86 cents to \$1.06 from 1955 to 1959. Although more vaccines were used in 1959 than in 1940,

TABLE 21.--Feed expenditures, including grazing fees, per ranch, commercial family-operated cattle ranches, Southwestern Nonmigratory Grazing Area, averages 1940-44 and 1945-49, annual 1950-59

Year	Alfalfa hay			Protein concentrates			Oats and barley			Salt and other minerals			Grazing fees			Total cost of feed and grazing
	Amount bought	Price per ton	Total cost	Amount bought	Price per ton	Total cost	Amount bought	Price per cwt.	Total cost	Amount bought	Price per cwt.	Total cost	Amount bought	Price per AUM	Total cost	
Average:	<i>Tons</i>	<i>Dol.</i>	<i>Dol.</i>	<i>Tons</i>	<i>Dol.</i>	<i>Dol.</i>	<i>Cwt.</i>	<i>Dol.</i>	<i>Dol.</i>	<i>Cwt.</i>	<i>Dol.</i>	<i>Dol.</i>	<i>AUM</i>	<i>Dol.</i>	<i>Dol.</i>	<i>Dol.</i>
1940-44.	25.2	15.32	386	4.4	54	239	177.2	2.01	357	111.4	0.88	98	902	0.166	150	1,230
1945-49.	15.9	27.55	438	8.6	88	756	175.5	3.39	594	107.2	1.25	134	921	.393	362	2,284
1950.....	11.2	30.10	337	8.9	92	819	153.4	3.35	514	129.8	1.45	188	920	.657	604	2,462
1951.....	12.3	42.57	524	17.4	100	1,740	132.6	3.92	520	127.8	1.56	199	1,239	1.073	1,329	4,312
1952.....	14.2	44.12	627	21.0	104	2,184	181.4	3.95	717	141.4	1.59	225	1,037	.940	975	4,728
1953.....	23.9	38.31	916	30.8	78	2,402	147.8	2.69	398	127.7	1.67	213	877	.704	617	4,546
1954.....	10.2	38.56	393	23.3	84	1,957	139.4	3.08	429	135.7	1.64	223	875	.630	551	3,553
1955.....	5.0	32.00	160	16.0	75	1,200	150.0	2.53	380	133.5	1.67	223	819	.607	497	2,460
1956.....	16.0	35.50	568	22.5	80	1,800	100.0	2.72	272	132.5	1.70	225	800	.566	453	3,318
1957.....	0	25.60	0	10.0	76	760	100.0	2.33	233	85.6	1.76	151	685	.209	143	1,287
1958.....	0	22.00	0	2.5	69	172	60.0	2.15	129	89.8	1.78	160	671	.276	185	646
1959 ¹	8.0	24.31	194	3.0	76	228	140.0	2.24	314	97.8	1.89	185	705	.333	235	1,156

¹ Preliminary.

the increased cost of veterinary supplies resulted mainly from the increased prices of vaccines. Prices of veterinary supplies increased more than 400 percent during this period.

Machinery Purchases and Other Machinery Expense

Until 1945, purchases of machinery were a relatively small item on cattle ranches. In most of the 20 years of the study period, 50 percent or more of the total purchases of machinery were for ranch pickup trucks. Although purchases of other machinery, including livestock, blacksmith, well, fencing, and crop equipment, were occasionally larger than truck purchases, in most years other machinery bought cost less than \$125.

About half of the operators of southwestern family-operated cattle ranches owned tractors in 1959, and these tractors were used about 450 to 500 hours per year. In 1950, less than a third of the operators owned tractors or any large amount of cropping equipment. However, three-fourths of the operators owned pickups in 1945; all of them owned pickups in 1950; and more than half owned two pickups in 1954. More than four-fifths of the ranchers owned automobiles. Only a part of the operating costs of automobiles was charged to the ranch enterprise.

Other machinery expense consisted chiefly of automobile and truck operating costs (table 22). Until 1950, operating and repair costs of tractors and other machinery were less than \$100 per year. Since 1950, these costs have increased by 64 percent, because of increased prices for tractors and other machinery, fuels, tires, oils, and repairs, and the increased quantities purchased. Depreciation for vehicles amounted to about a third of total operating and depreciation costs.

Table 23 presents the details of truck operating costs. Truck operating costs per ranch increased each year from 1940 to 1959, except in 1955 and 1956. Over the period, truck operating costs increased more than seven times. This increase was because of more pickups per ranch, increased mileage driven per pickup, and increased costs per mile for gas, oil, and repairs. As a result, the total cost of operating pickups on southwestern cattle ranches, including depreciation costs, has become a substantial part of total expenses.

Building and Improvement Expense

Ranch buildings and range-improvement expenditures were relatively large in the early forties. In 1940, an extensive improvement program aided by governmental assistance accounted for 36 percent of total

TABLE 22.--Operating and depreciation costs of motor vehicles and other machinery, per ranch, commercial family-operated cattle ranches, Southwestern Nonmigratory Grazing Area, averages 1940-44 and 1945-49, annual 1950-59

Year	Motor vehicles							Tractors and other machinery						
	Operating costs			Depreciation			Total operating and depreciation costs	Operating costs			Annual depreciation			Total operating and depreciation costs
	Auto-mobiles (ranch share)	Motor-trucks	Total	Auto-mobiles (ranch share)	Motor-trucks	Total		Tractors	Other machinery	Total	Tractors	Other machinery	Total	
Average:	Dol-lars	Dol-lars	Dol-lars	Dol-lars	Dol-lars	Dol-lars	Dol-lars	Dol-lars	Dol-lars	Dol-lars	Dol-lars	Dol-lars	Dol-lars	Dol-lars
1940-44.	149	161	310	53	74	127	437	9	36	45	11	77	88	133
1945-49.	175	328	503	59	173	232	735	21	47	68	41	102	143	211
1950.....	211	501	712	69	274	343	1,055	37	63	100	81	137	218	318
1951.....	224	537	761	76	327	403	1,164	54	74	128	78	160	238	366
1952.....	255	702	957	90	353	443	1,400	57	101	158	74	219	293	451
1953.....	283	768	1,051	93	354	447	1,498	63	103	166	69	203	272	438
1954.....	294	805	1,099	92	347	439	1,538	67	100	167	66	226	292	459
1955.....	302	712	1,014	96	357	453	1,467	68	70	138	66	205	271	409
1956.....	276	590	866	86	318	404	1,270	60	56	116	58	189	247	363
1957.....	296	847	1,143	94	369	463	1,606	62	60	122	64	175	239	361
1958.....	296	880	1,176	97	494	591	1,767	62	70	132	100	180	280	412
1959 ¹	314	945	1,259	103	541	644	1,903	64	100	164	106	202	308	472

¹ Preliminary.

TABLE 23.--Operating costs of motortrucks, per ranch, commercial family-operated cattle ranches, Southwestern Nonmigratory Grazing Area, averages 1940-44 and 1945-49, annual 1950-59

Year	Trucks on ranch Jan. 1	Miles driven--		Operating cost				Depreciation	Operating and depreciation cost ¹
		Per truck	Per ranch	Per mile			Per ranch		
				Gasoline and oil	Repairs	Total			
Average:	Number	Miles	Miles	Cents	Cents	Cents	Dollars	Dollars	Dollars
1940-44.....	0.617	9,415	5,809	1.41	1.36	2.77	161	74	235
1945-49.....	.858	10,569	9,068	1.70	1.92	3.62	328	173	501
1950.....	1.058	12,352	13,068	1.89	1.94	3.83	501	274	775
1951.....	1.125	12,389	13,938	1.89	1.96	3.85	537	327	864
1952.....	1.382	12,446	17,200	1.97	2.11	4.08	702	353	1,055
1953.....	1.476	12,514	18,471	2.03	2.13	4.16	768	354	1,122
1954.....	1.507	12,514	18,859	2.07	2.20	4.27	805	347	1,152
1955.....	1.509	11,000	16,599	2.09	2.20	4.29	712	357	1,069
1956.....	1.529	9,000	13,761	2.08	2.21	4.29	590	318	908
1957.....	1.534	11,750	18,024	2.40	2.30	4.70	847	369	1,216
1958.....	1.534	12,500	19,175	2.29	2.30	4.59	880	494	1,374
1959 ²	1.734	11,650	20,200	2.33	2.35	4.68	945	541	1,486

¹ Does not include interest, insurance, or taxes.

² Preliminary.

cash expenditures. During this year and the years that followed, ranchers spent a large share of total expenses on improvements. These improvements consisted of cross fences, replacement of boundary fences, water developments, and small amounts of range-improvement work, such as artificial range reseeding, brush con-

trol, and installment of rotation or deferred grazing systems, or both.

Hired Labor Costs

Labor requirements per unit of production at 5-year intervals are given in table 24. Labor requirements per acre of crops

dropped sharply from 1940 to 1959, reflecting the replacement of horses and horse-drawn equipment by tractors and tractor equipment, trucks, and improved production practices on ranches where crops were grown in any substantial quantities. The introduction of labor-saving methods and devices has been less important in livestock than in crop enterprises.

Total labor requirements for crop and livestock production are shown in table 25. Livestock accounted for more than 89 percent of the total labor requirements.

The average monthly labor distribution for the 15 years 1940-54 is shown in figure 6. Little or no change occurred during the 1950's. Labor requirements reached a peak in April and May with calving, branding, and planting of crops. A slight increase

TABLE 24.--Yearly labor requirements per unit of crops and livestock, commercial family-operated cattle ranches, Southwestern Nonmigratory Grazing Area, averages, 1940-59

Item	1940-44			1945-49			1950-59 ¹		
	Pre-harvest	Harvest	Total	Pre-harvest	Harvest	Total	Pre-harvest	Harvest	Total
Crops per acre:									
Irrigated:	<i>Hours</i>	<i>Hours</i>	<i>Hours</i>	<i>Hours</i>	<i>Hours</i>	<i>Hours</i>	<i>Hours</i>	<i>Hours</i>	<i>Hours</i>
Corn fodder.....	15.0	10.0	25.0	11.5	6.5	18.0	9.5	5.5	15.0
Sorghum fodder.....	14.0	6.0	20.0	10.5	5.5	16.0	9.5	4.5	14.0
Nonirrigated:									
Corn fodder.....	5.0	5.0	10.0	3.0	6.0	9.0	1.5	5.0	6.5
Sorghum fodder.....	3.0	5.0	8.0	2.0	4.5	6.5	1.5	4.0	5.5
Farm garden.....	20.0	10.0	30.0	20.0	10.0	30.0	15.0	10.0	25.0
Livestock per head:									
Cows milked.....	---	---	140.0	---	---	132.0	---	---	130.0
Beef cows and 2-year-old heifers....	---	---	15.0	---	---	15.0	---	---	15.0
Other cattle.....	---	---	9.0	---	---	9.0	---	---	9.0
Stock sheep.....	---	---	6.0	---	---	4.2	---	---	3.0
Goats.....	---	---	7.0	---	---	6.0	---	---	2.0
Chickens.....	---	---	1.8	---	---	1.9	---	---	2.0
Hogs per cwt.....	---	---	4.0	---	---	3.6	---	---	3.4
Horses.....	---	---	65.0	---	---	52.0	---	---	50.0
Colts.....	---	---	12.0	---	---	12.0	---	---	12.0

¹ 1959 Preliminary.

TABLE 25.--Labor requirements per ranch, commercial family-operated cattle ranches, Southwestern Nonmigratory Grazing Area, averages 1940-44 and 1945-49, annual 1950-59

Year	Livestock				Crops			Miscellaneous	Total labor requirement ¹	
	Beef cattle	Horses	Other	Total	Irrigated	Non-irrigated	Total			
Average:	<i>Hours</i>	<i>Hours</i>	<i>Hours</i>	<i>Hours</i>	<i>Hours</i>	<i>Hours</i>	<i>Hours</i>	<i>Hours</i>	<i>Hours</i>	<i>Days</i>
1940-44.....	2,798	648	286	3,732	145	128	273	200	4,205	420
1945-49.....	2,816	506	269	3,591	122	92	214	190	3,995	399
1950.....	2,822	469	258	3,549	104	78	182	186	3,917	392
1951.....	2,892	428	246	3,566	110	80	190	188	3,944	394
1952.....	2,910	406	319	3,635	109	75	184	190	4,009	401
1953.....	2,927	349	222	3,498	104	73	177	184	3,859	386
1954.....	2,792	293	236	3,321	104	73	177	182	3,680	368
1955.....	2,645	303	254	3,202	138	64	202	186	3,590	359
1956.....	2,652	293	221	3,166	142	47	189	185	3,540	354
1957.....	2,508	273	199	2,980	149	51	200	190	3,370	337
1958.....	2,488	299	189	2,976	147	47	194	200	3,370	337
1959 ²	2,773	256	201	3,230	154	26	180	200	3,610	361

¹ 10-hour day.

² Preliminary.

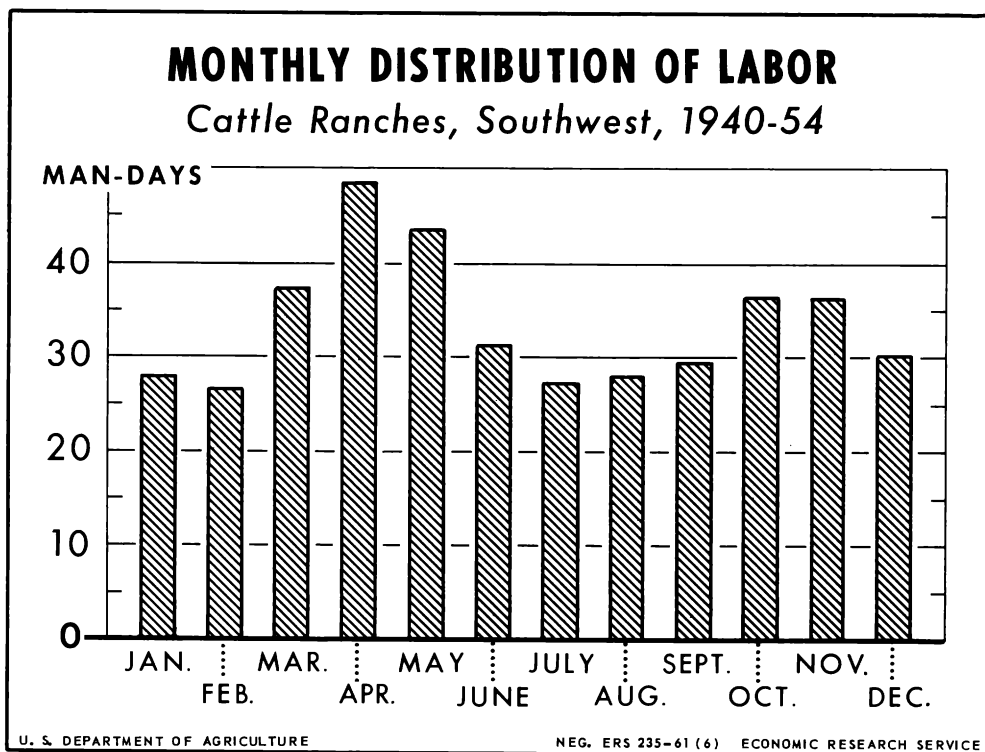


Figure 6

was also noted in the fall with the culling and marketing of livestock and the harvesting of forage crops.

Farm wage rates are lower in the southwestern area than in other range livestock areas, and cattle ranchers devote a larger share of their time to management than is common in most other western range areas.

A very high proportion of labor on southwestern cattle ranches is used in the cattle enterprise. Most of this labor, particularly the hired labor, is used in the spring for calving and branding and in the fall for roundup and marketing of livestock (fig. 7).

However, ranch labor is becoming more expensive, and ranch operators and their families are performing a larger share of ranch work (table 26). Costs of hired labor, while increasing about 129 percent from 1940 to the peak year of 1952, have been reduced relative to other costs in recent years. Ranch operators have been unwilling to pay higher wages for labor and experienced hands have not been available. As a result, total labor hired was reduced from an average of 204 days per ranch in 1940 to 76 days per ranch in 1958. A part of this

reduction, however, resulted from efforts by ranchers to reduce their total expenses.

Taxes

Taxes on real estate are by far the most important taxes on these family-operated cattle ranches (table 27). During the 20-year period, real estate taxes ranged from 68 to 82 percent of total ranch taxes. In 1940, taxes on real estate were \$156. In 1959, they were \$749. Personal property taxes on livestock, salable crops, and machinery have been relatively small (\$72 in 1940 and \$204 in 1959).

Tax rates based on \$100 of current value of real estate did not change materially from 1940 to 1959. Sharply rising land values offset increases in tax rates. Although it has been easier for tax assessors to set an assessed value on livestock, the rigid values assigned to livestock from year to year in the assessment procedure tended to lower the rate per \$100 of current value. Also, tax rolls seldom include all cattle actually in a particular area. These factors combined to cause very low tax rates per \$100 of current livestock values



Figure 7--Roundup time means hard work for New Mexico's cowboys, but the job is but half done when the cattle are finally corralled. Once in the corral, the calves must be roped and branded. Here branding irons are heating in the foreground, while two calves are being branded. (N-9410)

TABLE 26.--Labor force and hired labor cost per ranch, commercial family-operated cattle ranches, Southwestern Nonmigratory Grazing Area, average 1940-44 and 1945-49, annual 1950-59

Year	Family workers (man equivalents)	Work done by family ¹	Hired labor	Wage rate per day	Hired labor cost
	<i>Number</i>	<i>Days</i>	<i>Days</i>	<i>Dollars</i>	<i>Dollars</i>
Average:					
1940-44.....	1.42	215	205	2.73	560
1945-49.....	1.47	247	153	4.27	653
1950.....	1.34	239	153	4.65	711
1951.....	1.33	242	152	5.23	795
1952.....	1.33	249	152	5.31	807
1953.....	1.31	248	138	5.31	733
1954.....	1.28	266	102	5.35	546
1955.....	1.26	258	101	5.31	536
1956.....	1.24	260	94	5.50	517
1957.....	1.23	246	91	5.31	483
1958.....	1.24	260	76	5.76	438
1959 ²	1.25	250	111	6.16	684

¹ Based on a maximum of 200 10-hour days per man equivalent, adjusted to annual variations. Includes operator.

² Preliminary.

TABLE 27.--Real estate and personal property taxes per ranch, commercial family-operated cattle ranches, Southwestern Nonmigratory Grazing Area, averages 1940-44 and 1945-49, annual 1950-59

Year	Value of--			Taxes paid on--				
	Land and buildings	Machinery and feed	Livestock	Real estate	Personal property			All property
					Machinery and feed	Livestock	Total	
Average:	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>
1940-44.....	32,798	2,404	10,908	195	11	69	80	275
1945-49.....	59,449	3,650	19,008	357	15	81	96	453
1950.....	86,483	4,903	26,475	436	20	114	134	570
1951.....	91,779	5,397	37,011	389	19	137	156	545
1952.....	108,235	6,895	39,618	501	23	147	170	671
1953.....	117,788	7,029	23,973	594	23	132	155	749
1954.....	108,627	6,638	20,641	601	26	131	157	758
1955.....	103,898	6,140	19,734	605	25	120	145	750
1956.....	104,381	6,101	20,158	611	26	131	157	768
1957.....	105,087	5,571	18,252	661	24	131	155	816
1958.....	112,562	5,618	22,478	714	24	157	181	895
1959 ¹	118,839	5,711	33,122	749	22	182	204	953

¹ Preliminary.

in several years, particularly 1951 and 1952.⁶

Miscellaneous Expenditures

Miscellaneous expenditures include ranch share of telephone and electricity costs; association fees, registration fees, subscriptions to livestock journals, newspapers, and reports; insurance on equipment, vehicles, and buildings; legal and bookkeeping fees for the ranch business; and board for hired labor (table 28).

Expenditures for association fees, livestock registration fees, and subscriptions to livestock journals and newspapers have remained relatively constant, except that increased rates caused this small expense to double in amount from 1940 to 1959. This was true also of expenditures for insurance on equipment, vehicles, and buildings. Bookkeeping and legal fees increased as a result of operating a larger ranch business and because of complexities in reporting income and social security taxes.

MEASURES OF PRODUCTION, COSTS, AND RETURNS

Two problems arise in measuring the total volume of an aggregate of physical

⁶For a tabular presentation of these discrepancies see the New Mexico Tax Commission, Ninth Biennial Report, July 1, 1950 to June 30, 1952, p. 81, Santa Fe, N. Mex. 1952.

quantities. One is that of adding together unlike items, such as miles of travel by pickup, tons of protein concentrates, and pounds of fence staples. The other problem is one of weighting the items in proportion to their importance in the total.

The two problems are resolved by multiplying each quantity by its respective price during a specific period of years, designated as the base period. The sum of products in any given year is divided by the sum of the products in the base period. These ratios are then expressed as percentages of the average base-period value (or index numbers) to show relative changes from year to year during the 20-year period.⁷

The index numbers of production (outputs) and resources used in production (inputs) do not show specific levels at any given time. Instead, they indicate year-to-year changes in level, with the base period 1947-49 averaging 100. For example, the index of gross production of 118 in 1959 indicates that production in that year was 18 percent greater than the average total production in the base period 1947-49 (table 29).

Changes in Production and Input

Gross production on southwestern family-operated cattle ranches tends to follow the

⁷The techniques used in calculating the various indexes are described in the appendix.

TABLE 28.--Miscellaneous expenditures per ranch, commercial family-operated cattle ranches, Southwestern Nonmigratory Grazing Area, averages 1940-44 and 1945-49, annual 1950-59

Year	Telephone	Electricity	Association fees, registration fees, and newspapers	Insurance on equipment, vehicles, and buildings	Legal and bookkeeping fees	Board for hired labor	Total miscellaneous expenditures
Average:	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>
1940-44.	11	26	15	74	15	108	249
1945-49.	49	30	24	92	25	125	345
1950.....	73	31	30	100	30	141	405
1951.....	77	33	31	102	35	157	435
1952.....	79	35	33	104	40	160	451
1953.....	76	31	30	100	35	144	416
1954.....	73	30	29	98	36	104	370
1955.....	70	30	25	102	38	107	372
1956.....	72	31	25	102	35	106	371
1957.....	75	34	30	100	40	106	385
1958.....	77	36	32	115	40	62	362
1959 ¹	80	40	36	120	45	132	453

¹ Preliminary.

TABLE 29.--Cost, returns and related factors per farm, index numbers, commercial family-operated cattle ranches, Southwestern Nonmigratory Grazing Area, averages 1940-44 and 1945-49, annual 1950-59 (1947-49 = 100)

Item	Average		1950	1951	1952	1953	1954	1955	1956	1957	1958	1959 ¹
	1940-44	1945-49										
Gross ranch income.....	49	87	127	154	92	75	69	85	55	94	134	131
Net ranch income.....	37	77	161	162	20	-9	6	53	-19	85	162	146
Gross ranch production.....	97	101	98	103	89	101	85	96	77	98	109	118
Net ranch production.....	98	101	105	95	76	84	78	96	63	103	122	134
Production per hour of man labor..	92	100	105	95	75	86	84	106	70	120	143	147
Production per unit of input.....	102	102	100	93	78	82	76	88	69	94	108	114
Input per unit of production.....	98	98	100	107	128	123	132	114	145	107	93	88
Operating expense per unit of production.....	59	93	103	144	166	138	138	113	146	104	102	102
Total cost per unit of production.	56	90	109	137	166	139	147	122	157	122	128	124
Power and machinery.....	81	94	107	110	126	144	147	140	139	136	133	139
Prices received for products sold.	48	85	130	152	103	70	80	86	71	93	117	109
Prices paid, including wages to hired labor.....	60	94	106	128	127	108	109	104	104	105	125	130

¹ Preliminary.

general trend in annual precipitation, although it varies in any particular year from a value based on the precipitation total. Ranchers in this area try to maintain production in years of drought by substituting inputs of purchased feed for range. Total inputs, therefore, vary inversely with precipitation or the range forage condition index.

The index of gross production (or output) varied around the 1947-49 level throughout the period of study. The low point of 77 index points was reached in 1956.

Input, as used here, represents all resources used in production. Management and labor are not separated in this study. The index of total inputs is probably the best single measure of change in scale of operation. Variation in input since 1940 is shown graphically in figure 8. Total inputs usually increased in periods of below-average precipitation and decreased in periods of above-average precipitation.

Annual average production per unit of input for southwestern family-operated cattle ranches is shown in figure 8. The trend in production per unit of input was

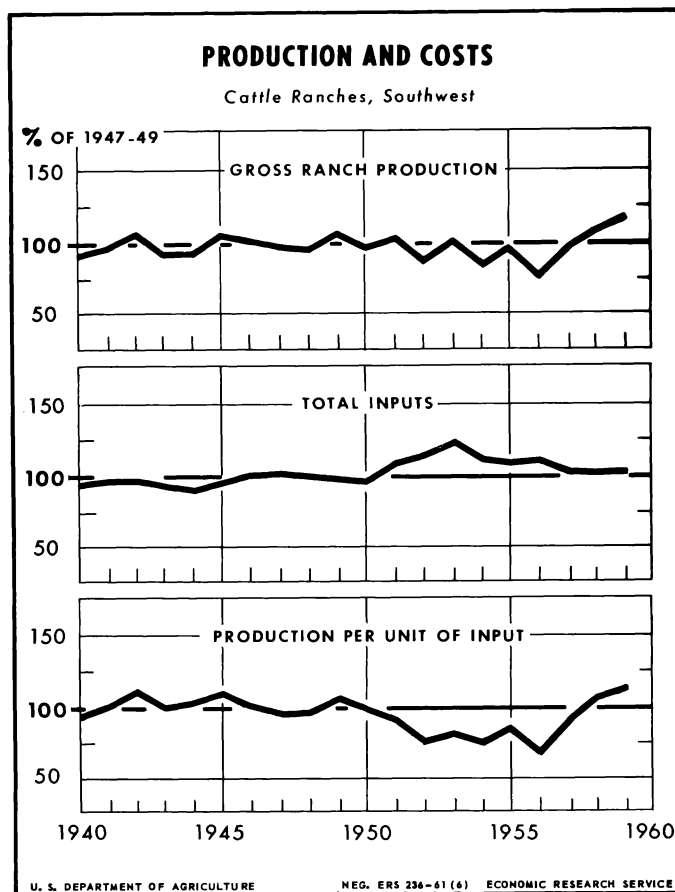


Figure 8

generally downward until 1957. The effects of years or periods with relatively favorable moisture are apparent in the figure. The peaks occurred in 1942, 1945, 1949, and 1959, all of which were years with, or following, favorable weather.

Measures of Variation in Costs and Returns

Input per unit of production (fig. 9) is a measure of the volume of physical and economic resources expended to produce a unit of physical product on a constant price-level basis.

Both operating expense and total cost rose rapidly from 1941 to 1952. In this period, the price level increased sharply, particularly after 1945. Decreased expense and cost in 1949 were caused by both a drop in prices paid for items used in production and favorable range forage conditions, which reduced purchases of feed. In 1953 another drop in the index of prices occurred when a national drought-relief program permitted

ranchers in New Mexico and Texas to buy feeds at reduced prices.

Prices paid by ranchers for items used in production, including wages to hired labor, tend to be more stable than prices received by ranchers, and they tend to lag behind prices received (fig. 10). The index of prices received varied 96 index points from 1945 to 1951, while the index of prices paid varied about half as much, or 49 index points. Partly because prices paid rose faster than prices received from 1942 to 1945, net ranch income on southwestern family-operated cattle ranches decreased during this period of general prosperity in United States agriculture. A high plateau of net ranch income was reached in 1950 and 1951, partly because of the favorable relationship between prices and wages paid and prices received. Another high plateau in net ranch income occurred in 1958 and 1959, despite an unfavorable relationship between prices paid and received. Very favorable weather permitted favorable rates of production.

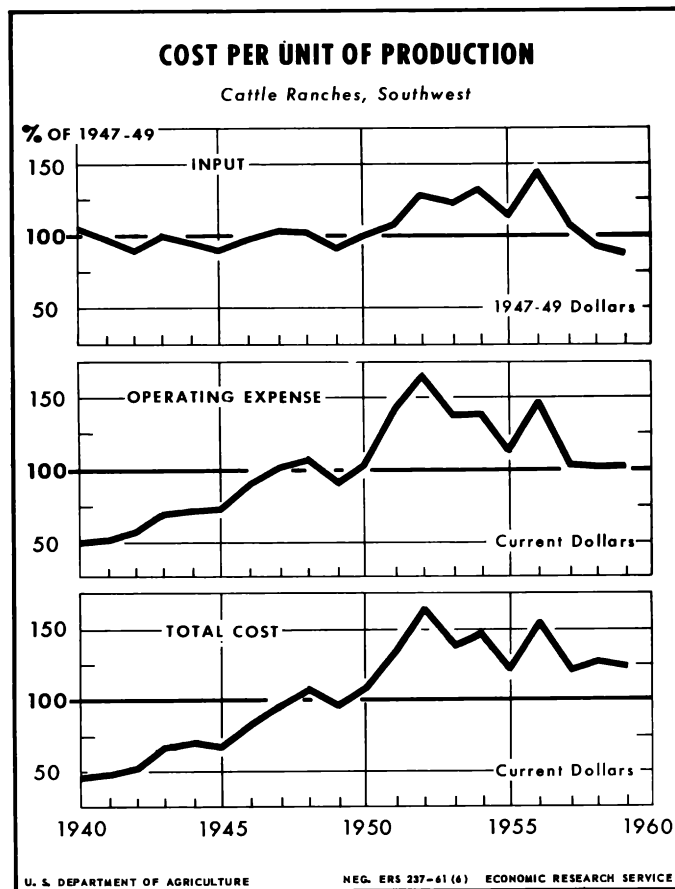


Figure 9

Distribution of Income

It is difficult to estimate charges for the use of capital, particularly investment in land on western livestock ranches. The usual method for estimating charges for capital invested in livestock ranches is to apply current mortgage interest rates charged by Federal land banks on such property to estimated current values of the property. The assumption is thus made that the operator could either obtain funds at such rates to buy similar property or could invest his funds in real estate or similar properties at such rates.

The sum of capital charges on real estate and working capital was subtracted from net ranch income to determine the returns to the operator and his family for their labor and management (fig. 11).

An additional measure of cost is the expense per dollar of gross ranch income (fig. 12).

This figure also presents the allocation of net ranch income to capital and to the

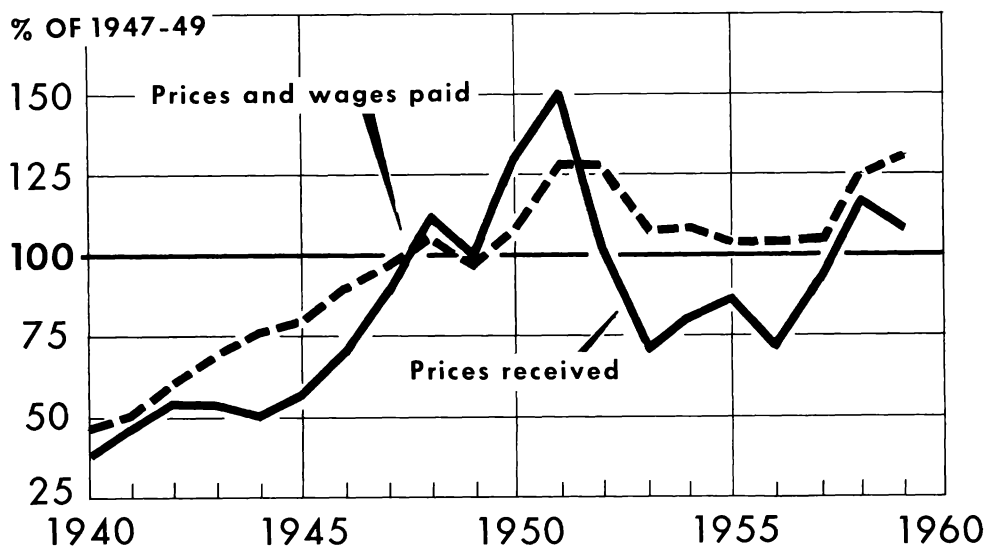
operator and his family for their labor and management. Except in 1941-42, 1948-51, and 1958-59, the returns were not sufficient to allow the operator and his family a return for their labor after a charge was made for capital. During these three periods, net ranch incomes were modest. From 1943 to 1947, losses were modest also. From 1952-57, net ranch income was so low that little return was available for either capital charges or returns to the operator and his family for their labor and management. These years represented a period of serious economic stress on southwestern family-operated cattle ranches.

Costs of Beef Production

Some of the programs dealing with beef cattle stress proficiency testing and weight-for-age problems. This trend in research and extension work will make ranchers more aware of "per-unit values," such as

PRICES RECEIVED AND PAID

Cattle Ranches, Southwest



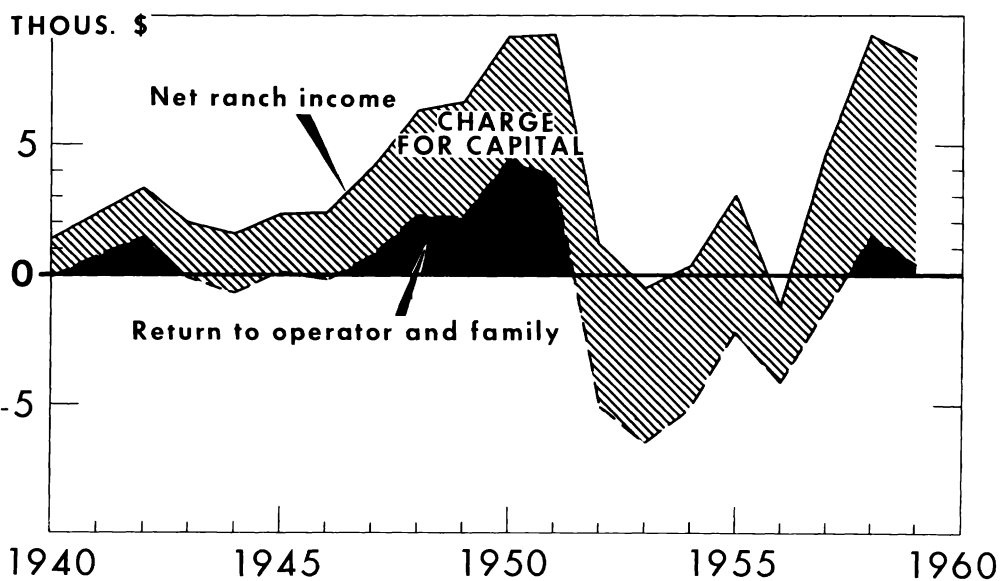
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Figure 10

NET RETURNS

Cattle Ranches, Southwest



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Figure 11

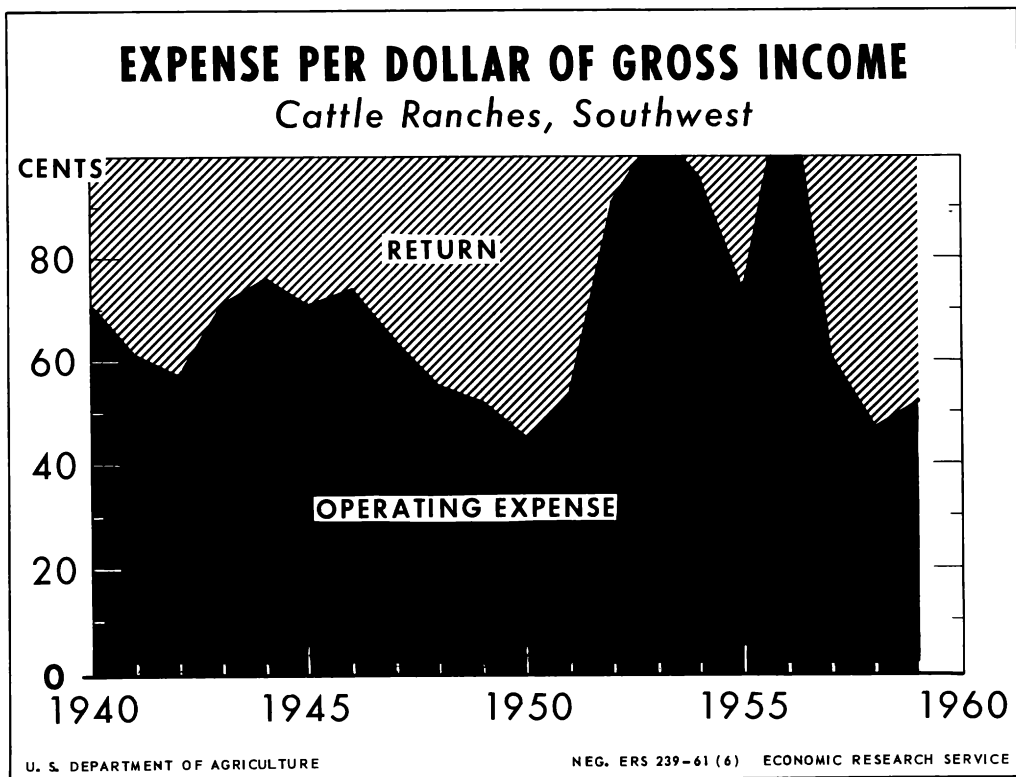


Figure 12

pounds of beef produced per bull or pounds of gain per month of age. As the beef enterprise contributed around 97 percent of the total gross cash income received on southwestern family-operated cattle ranches, the ranches studied can be considered to be single-enterprise units. On this basis, total ranch expenses can be divided by the net production or turnoff of beef to arrive at unit costs of producing beef. (Ranch operating expense includes cash expenditures and net depreciation of machinery, equipment, and buildings.) It does not include charges for operator and family labor and use of capital.

Total operating expense per 100 pounds of live beef exceeded the price received in only 3 years of the study, 1953, 1954, and 1956 (table 30 and fig. 13). In 1953, operating expense exceeded price by \$4.45. The widest spread occurred in 1950, 1951, and 1958, when prices exceeded operating expenses by \$15.15, \$13.69, and \$13.73 per hundredweight, respectively.

Effects of Price and Production Levels on Net Ranch Income

An attempt was made to combine the effects of three different price conditions

and three different production levels on net ranch income (fig. 14). In this analysis, production during the base period 1947-49 was increased by 20 percent, held constant, and decreased by 20 percent. Also, the ratio of prices received to prices paid, which was 100 percent during the base period, was adjusted so that prices received were 110 percent of prices paid in the first series, 90 percent in the second, and 70 percent in the third. All three of these price ratios occurred during the period 1940-59. Although production levels reached 80 and 100 percent of the base period in one or more years of the study, 120 percent is the estimated level of production that probably would have occurred during the 1950-59 period if weather had been favorable.

When these production levels and price ratios are applied to the levels of outputs or inputs, or both, in the base period 1947-49, estimated net ranch income varies from a loss of \$196 to a gain of \$9,680. A low price ratio with a high level of production probably would yield a net ranch income of \$3,445, while a high price ratio with low production would yield about \$3,966. With high production, despite the application of a low price ratio, the estimated net ranch income of \$3,966 would

TABLE 30.--Estimated total ranch operating expense of producing 100 pounds of cattle and calves, commercial family-operated cattle ranches, Southwestern Nonmigratory Grazing Area, averages 1940-44 and 1945-49, annual 1950-59

Item	Average		1950	1951	1952	1953	1954	1955	1956	1957	1958	1959 ¹
	1940-44	1945-49										
Production of cattle and calves:	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.
Sales.....	536.4	572.8	524.2	540.5	516.5	586.3	570.2	507.4	523.9	556.6	469.3	636.3
Used in ranch household.....	12.8	7.7	5.5	6.6	6.8	11.1	9.3	11.2	10.3	13.5	12.4	9.3
Inventory change.....	23.6	-4.1	34.7	25.9	7.1	-63.5	-98.1	9.1	-78.3	-20.2	202.7	48.0
Total.....	572.8	576.4	564.4	573.0	530.4	533.9	481.4	527.7	455.9	549.9	684.4	693.6
Cash expenditures per cwt. of cattle and calves produced: ²	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.
Feed, including grazing fees....	2.15	3.96	4.36	7.53	8.91	8.52	7.38	4.66	7.28	2.34	.94	1.67
Livestock purchased.....	1.44	2.40	1.94	4.22	2.89	1.79	.86	1.85	1.56	2.88	4.08	3.15
Other livestock expense.....	.05	.07	.12	.14	.17	.19	.20	.18	.23	.20	.17	.20
Crop.....	.01	.02	.01	.01	.02	.01	.02	.02	.02	.02	.01	.02
Machinery purchased.....	.40	.89	1.14	1.69	2.11	1.10	1.31	1.35	.78	1.21	2.03	1.91
Other machinery expense.....	.78	1.08	1.35	1.42	1.91	2.09	2.42	2.05	2.03	2.31	1.86	1.97
Ranch buildings and improvements	2.04	1.82	2.18	1.69	1.77	1.13	1.06	1.00	.28	.30	.66	.98
Hired labor.....	.98	1.13	1.26	1.38	1.52	1.37	1.13	1.02	1.13	.88	.64	.99
Taxes.....	.48	.79	1.01	.95	1.27	1.40	1.58	1.42	1.68	1.48	1.31	1.37
Miscellaneous expenses.....	.43	.60	.72	.76	.85	.78	.77	.71	.81	.70	.53	.65
Total.....	8.76	12.76	14.09	19.79	21.42	18.38	16.73	14.26	15.80	12.32	12.23	12.91
Net depreciation of machinery and buildings per cwt. of live beef produced.....	-1.33	-.63	-.88	-.68	-.67	.99	1.34	1.11	2.46	1.40	-.11	-.02
Total expense per cwt. of cattle and calves produced.....	7.43	12.13	13.21	19.11	20.75	19.37	18.07	15.37	18.26	13.72	12.12	12.89
Weighted price received per cwt. of cattle and calves.....	10.21	17.91	28.36	32.80	21.84	14.92	16.77	18.40	15.18	19.71	25.85	23.74

¹ Preliminary.

² In the 20-year period 1940-59, the beef cattle enterprise accounted for 96 percent of total gross cash income. The minimum contribution of this enterprise was 91 percent in 1940. If Government payments are included in the beef enterprise (a logical procedure as most payments resulted from range-improvement practices), the average contribution of the beef cattle enterprise would be 98 percent, and the minimum 96 percent in 1952. Therefore, no attempt was made to segregate expenditures per ranch into the various enterprises and all expenses were charged to the main enterprise.

still exceed income for any year of the study other than the period 1947-51 and 1958 and 1959.

INDEX NUMBERS OF PRODUCTION, COSTS, AND RETURNS

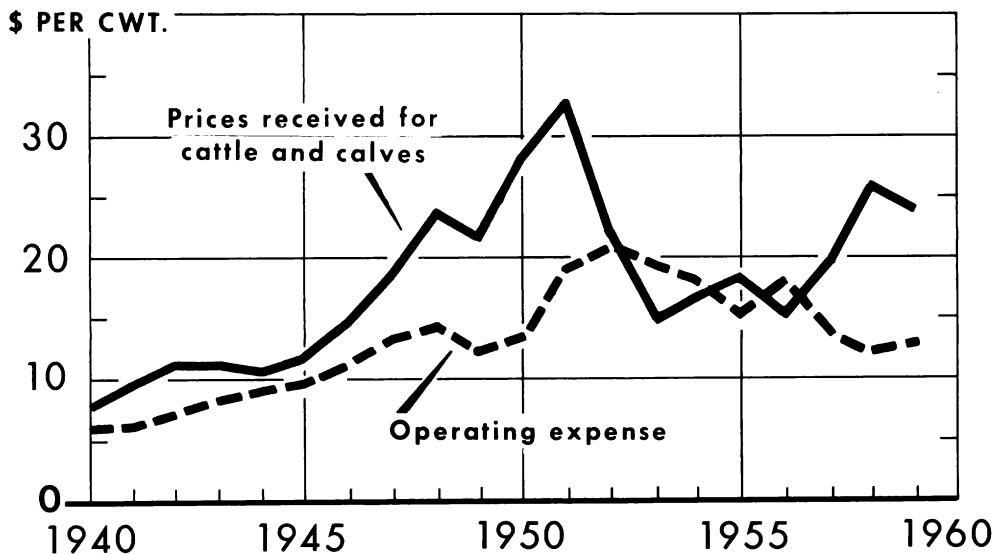
An important part of this project is the development and construction of several series of index numbers to give summary measures of changes in several significant items and to permit and facilitate direct comparisons of production, prices, costs, and returns. Important factors in explaining, measuring, and comparing income are changes in production and changes in acreages and proportions of land, labor, and capital that are used, as well as the effectiveness with which they are utilized in production. Such changes must be studied in the light of shifts in price-cost relationships.

In recent years, production and income have increased and decreased on nearly all farms and ranches, but the extent to which they have risen and fallen and the causes for the changes differ materially from farm to farm. Some ranchers have obtained higher production by operating more land, keeping more livestock, buying more feed, and hiring more labor. Others have obtained higher production with substantially less labor by using more machinery, equipment, and feed and operating more land. In some instances, costs of production have increased; in others, costs have changed very little or have decreased.

To provide a direct means of measuring the effect of production, farm practices, methods of production, mechanization, prices, costs, and related factors on ranch income and the economic well-being of ranch families, all items of expense and income (including perquisites and changes in inventory) were assigned weights. All

PRICES RECEIVED AND OPERATING EXPENSE

Cattle Ranches, Southwest



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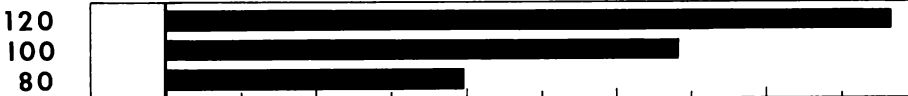
Figure 13

NET RANCH INCOME

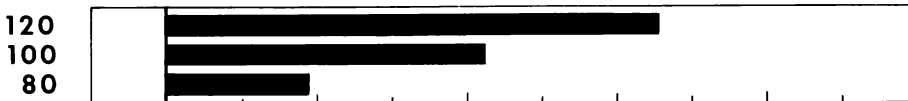
With Three Price Ratios and Production Levels

PRODUCTION
(% OF 1947-49)

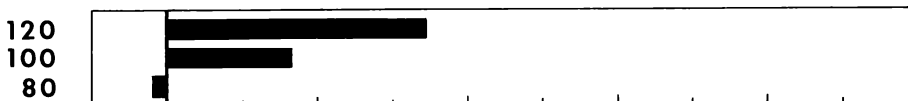
WITH PRICES RECEIVED 110 % OF PRICES PAID*



WITH PRICES RECEIVED 90 % OF PRICES PAID*



WITH PRICES RECEIVED 70 % OF PRICES PAID*



0 2,000 4,000 6,000 8,000 10,000

ESTIMATED NET RANCH INCOME (\$)

CATTLE RANCHES, SOUTHWEST.

* RATIO OF PRICES RECEIVED TO PRICES PAID 1947-49 = 100.

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Figure 14

important groups of items were then appropriately combined into a series of index numbers. Prices received and prices paid by ranch operators were each weighted respectively by the quantity of the particular item sold or bought. The formulae are weighted aggregates of actual prices and quantities. The formula for income or value is

$$\frac{\sum q_1 p_1}{(\sum q_1 p_1)_0} ; \text{ for quantity or production,}$$

$$\frac{\sum q_1 p_0}{(\sum q_1 p_1)_0} ; \text{ and for price, } \frac{\sum q_1 p_1}{\sum q_1 p_0}$$

The symbols p_1 and q_1 are current-year prices and quantities, respectively; p_0 is weighted average price in the base period. $(\sum(q_1 p_1))_0$ is $\sum(q_1 p_1)$, 1947 plus $\sum(q_1 p_1)$, 1948 plus $\sum(q_1 p_1)$, 1949 divided by 3. The weighted average prices and quantities for 1947-49 were used as base weights.

In the 20-year period covered by the study, both physical and economic conditions fluctuated greatly. A severe drought, a major war, and an economic recession occurred. As a result, no base period meets all purposes. The postwar period of 1947-49, which in this area included one favorable and two unfavorable production years, was used as a base period. A major advantage of using this period is that it provides a fairly recent peacetime base and is a base commonly used in index numbers. It is used in Costs and Returns studies in other areas. This 1947-49 base gives estimates, particularly for price, that are relatively high compared with those for most years covered by the study. However, it has other advantages and is reasonably acceptable as a base for series developed in similar studies in other areas. It is expected that the estimates in this study will be kept current. Further, it is hoped that as the various series are extended, a more suitable base can be found.

Index numbers are available for many items not presented in this report. Index numbers using the 1947-49 base period are presented in table 29 for the following selected items:

- Gross income;
- Net ranch production;
- Production per hour of man labor;
- Operating expense per unit of gross ranch production;

Total cost per unit of gross ranch production;

Total input per unit of gross ranch production;

Quantity of power and machinery used;

Prices received for products sold; and

Prices paid including wages to hired labor.

MORTGAGE DEBT AND INTEREST CHARGES

As stated earlier, this study is part of a nationwide study of costs and returns on commercial farms. To obtain comparability in these analyses, full ownership was assumed and the various estimates were made accordingly so that direct comparisons may be made with returns to operators of other types of farms and ranches. This procedure has been followed thus far in this report. As a matter of fact, most livestock ranches are owner-operated. But many of the owners, particularly in recent years, carry some indebtedness. To give additional information, mortgage debt and interest charges paid on these family-operated cattle ranches were calculated for each year of the study (table 31).

The average debt on cattle ranches was less than 20 percent of the total owned investment in all except the last 7 years of the study, 1953-59. Although the face value of this indebtedness was very large in 1959 (\$28,000), the large investment per ranch held the proportion mortgaged to low or moderate levels. The proportion mortgaged was relatively heaviest for livestock in the first half of the period and for real estate in the last half. Low income per ranch in the earlier period meant that ranchers used their livestock for collateral and the funds borrowed were used for operating expenses. From 1947 to 1957, ranchers borrowed substantial amounts with which to buy additional land, using their real estate as collateral. The drop in livestock inventory values from 1952 to 1957 caused the proportion mortgaged to more than double in 2 years because, despite the drop in livestock investments, amounts borrowed were maintained and even increased during the period.

The interest rate on mortgages and loans increased slightly for real estate mortgages and rather substantially for personal property loans. This increase occurred after 1951. Total interest paid on mortgages and loans was more than 10 times greater in 1955-59 than in 1940-44. Interest charges

TABLE 31.--Mortgage debt and interest paid per ranch, commercial family-operated cattle ranches, Southwestern Nonmigratory Grazing Area, averages 1940-44 and 1945-49, annual 1950-59

Year	Indebtedness		Interest rate		Interest paid			Debt as a percentage of total		
	Real estate	Personal property	Real estate	Personal property	Land	Livestock	Total	Owned real estate	Personal property	Owned investment
Average:	<i>Dollars</i>	<i>Dollars</i>	<i>Percent</i>	<i>Percent</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
1940-44.....	1,214	1,492	4.9	5.9	59	88	147	7.4	11.2	9.1
1945-49.....	3,967	2,599	5.0	5.6	198	146	344	12.4	11.5	12.0
1950.....	10,354	3,390	4.7	6.0	487	203	690	22.9	10.8	18.0
1951.....	12,395	3,816	4.9	6.0	607	229	836	22.4	9.0	16.6
1952.....	13,620	5,142	4.9	6.2	667	319	986	18.9	11.1	15.8
1953.....	15,790	5,670	5.1	6.5	805	369	1,174	22.3	18.3	21.1
1954.....	17,862	6,337	5.0	6.6	893	418	1,311	27.3	23.2	26.1
1955.....	17,950	7,250	5.1	6.7	915	486	1,401	28.5	28.0	28.4
1956.....	19,745	7,612	5.3	6.9	1,046	525	1,571	31.3	29.5	30.8
1957.....	21,460	7,280	5.5	7.0	1,180	510	1,690	35.3	31.1	34.2
1958.....	20,520	5,200	5.3	7.0	1,088	364	1,452	31.1	18.8	27.5
1959 ¹	21,520	6,500	5.2	6.7	1,119	436	1,555	30.9	17.0	26.0

¹ Preliminary.

have become an important cost on southwestern family-operated cattle ranches.

INVESTMENT, COSTS, AND RETURNS BASED ON A PART-OWNED INVESTMENT

Investments, costs, and returns based on investment in owned lands are given in table 32. These estimates differ from those given in tables 1 to 30. Estimates in tables 1 to 30 are based on owner operations, assuming all land operated is owned. Estimates given in table 32 are based on part-owner operations. Here, leasing costs are included in expenses, taxes on leased lands are excluded, and capital charges are based only on owned debt-free investments. These values are representative of the values

included in ranch records, operating statements, and tax forms.

Differences in net ranch income on this basis and in the series in tables 2 and 18 are slight until about 1947. Since 1947, the estimated net ranch income per ranch on a wholly owned basis is more than net income on a partly owned basis. By 1951, the difference was about \$1,000.

The estimated return to the operator and his family for labor and management on a part-owned investment basis averaged about \$1,000 to \$2,500 more than on a total ranch basis. On an owned investment basis, ranchers had a slight negative return in 1944 and large negative returns from 1952-57. However, these losses in the 1952-57 period were not as large as on a total ranch basis.

TABLE 32.--Estimated investment, receipts, expenses, and income per ranch based on owned portion of the ranch and actual operating expenses, commercial family-operated cattle ranches, Southwestern Nonmigratory Grazing Area, averages 1940-44 and 1944-49, annual 1950-59

Item	Average		1950	1951	1952	1953	1954	1955	1956	1957	1958	1959 ¹
	1940-44	1945-49										
	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>
Owned investment....	29,601	54,514	76,503	97,643	118,551	101,890	92,735	88,748	88,800	84,156	93,602	107,930
Real estate.....	16,289	31,856	45,125	55,235	72,038	70,888	65,456	62,874	62,998	60,774	65,910	69,641
Personal property..	13,312	22,658	31,378	42,408	46,513	31,002	27,279	25,874	25,802	23,382	27,692	38,289
Cash receipts.....	5,798	10,630	15,294	18,247	11,941	9,051	9,891	10,025	8,294	11,386	12,599	15,608
Cash expenditures...	5,141	7,758	8,738	12,282	12,459	11,253	9,656	9,140	9,175	8,841	10,091	10,672
Feed, grazing fees, and lease costs.....	1,441	2,550	2,804	4,609	5,026	4,930	3,948	2,782	3,780	1,695	1,002	1,456
Livestock purchased.....	823	1,386	1,093	2,416	1,533	955	413	975	713	1,584	2,796	2,187
Other livestock expense.....	29	43	67	82	88	103	96	97	103	112	116	136
Crop.....	6	10	6	7	12	8	8	10	10	13	10	11
Machinery purchased.....	231	511	643	968	1,121	589	632	711	354	663	1,387	1,326
Other machinery expense.....	446	625	763	815	1,014	1,114	1,166	1,082	926	1,270	1,273	1,367
Ranch buildings and improvements	934	838	986	774	750	482	408	424	62	130	360	544
Hired labor.....	560	653	711	795	807	733	546	536	517	483	438	684
Taxes.....	275	453	570	545	671	749	758	750	768	816	895	953
Miscellaneous.....	249	345	405	435	451	416	370	372	371	385	362	453
Interest on debt..	147	344	690	836	986	1,174	1,311	1,401	1,571	1,690	1,452	1,555
Net cash ranch income.....	657	2,872	6,556	5,965	-518	-2,202	-235	885	-881	2,545	2,508	4,936
Value of perquisites	518	697	757	952	953	974	910	883	919	1,067	1,134	1,011
Inventory change:												
Crops and live-stock.....	59	36	587	987	-751	-168	-1,781	220	-1,993	-70	3,805	637
Machinery and equipment.....	763	363	497	389	354	-531	-645	-589	-1,123	-771	77	15
Net ranch income....	1,997	3,968	8,397	8,293	38	-1,927	-1,751	1,399	-3,078	2,771	7,524	6,599
Charge for capital:												
Real estate.....	572	1,127	1,346	1,704	2,425	2,338	1,927	2,291	2,292	2,162	2,406	2,502
Working capital...	699	1,128	1,679	2,316	2,565	1,451	920	1,248	1,255	1,127	1,574	2,130
Return to operator and family.....	726	1,713	5,372	4,273	-4,952	-5,716	-4,598	-2,140	-6,625	-518	3,544	1,967

¹ Preliminary.

BIBLIOGRAPHY

Abel, H., and Broadbent, D.A. Trade in Western Livestock at Auctions. I. Development, Relative Importance, Operations. Utah Agr. Expt. Sta. Bul. 352, 128 pp., illus. 1952.

Allred, B.W. Range Conservation Practices for the Great Plains. U.S. Dept. Agr. Misc. Pub. 410, 20 pp., illus. 1940.

American Bankers Association, Agricultural Commission. Agricultural Credit and Related Data. Annual. 1951, 1953, 1957. New York, N.Y.

Barr, G.W., and Seltzer, R.E. Arizona Agriculture. Annual 1943-54, 1960. Ariz. Agr. Expt. Sta. Buls. 188, 192, 194, 202, 206, 211, 220, 226, 232, 242, 245, 252; Ariz. Agr. Ext. Serv. Bul. A-3. (For the earlier years G.W. Barr is the sole author; for 1952-53, he cooperated with R.E. Seltzer; for 1960, R.E. Seltzer is the sole author.)

Bird, R. Taxes Levied on Farm Property in the United States and Methods of Estimating Them. U.S. Dept. Agr. Statis. Bul. 189, 47 pp. 1956.

Bogue, D.J. State Economic Areas. 96 pp., illus. U.S. Govt. Print. Off. Washington. 1951.

Bonnen, C.A., and Thibodeaux, B.H. A Description of the Agriculture and Type-of-Farming Areas in Texas. Tex. Agr. Expt. Sta. Bul. 544, 91 pp., illus. 1937.

_____ and Ward, J.M. Some Economic Effects of Droughts on Ranch Resources. Tex. Agr. Expt. Sta. Bul. 801, 11 pp., illus. 1955.

Bridges, J.O. Reseeding Practices for New Mexico Ranges. N. Mex. Agr. Expt. Sta. Bul. 291, 48 pp., illus. 1942.

Brodell, A.D., and Carpenter, C.G. Harvesting Hay and Silage. U.S. Bur. Agr. Econ. F.M. 79, 18 pp. 1950. [Mimeographed.]

_____ and Cooper, M.R. Power and Machinery on Farms and Related Data. U.S. Agr. Res. Serv. ARS 43-26, 30 pp. 1956.

_____ and Kendall, A.R. Farm Consumption of Liquid Petroleum, Fuels and Motor Oil. U.S. Bur. Agr. Econ. F.M. 73, 21 pp. 1949. [Mimeographed.]

_____ and Kendall, A.R. Fuel and Motor Oil Consumption and Annual Use of Farm Tractors. U.S. Bur. Agr. Econ. F.M. 72, 25 pp. 1949. [Mimeographed.]

_____ and Kendall, A.R. Work Performed With Principal Farm Machines. U.S. Bur. Agr. Econ. F.M. 42, 44 pp. 1943. [Mimeographed.]

_____ Strickler, P.E., and Wallrabenstein, P.P. Farm Power and Farm Machines. U.S. Bur. Agr. Econ. F.M. 101, 35 pp. 1953. [Mimeographed.]

Clawson, M. Western Range Livestock Industry. 401 pp., illus. McGraw-Hill, New York. 1950.

Cockerill, P.W. A Statistical History of Crop and Livestock Production in New Mexico. N. Mex. Agr. Expt. Sta. Bul. 438, 40 pp. 1959.

_____ Hunter, B., and Pingrey, H.B. Freight Rates on New Mexico Livestock and Feed. N. Mex. Agr. Expt. Sta. Bul. 346, 14 pp. 1948.

Cooper, M.R., and others. Labor Requirements for Crops and Livestock. U.S. Bur. Agr. Econ. F.M. 40, 140 pp. 1943. [Mimeographed.]

Culley, M.J. An Economic Study of Cattle Business on a Southwestern Semidesert Range. U.S. Dept. Agr. Cir. 448, 24 pp., illus. 1937.

Davidson, R.D. Federal and State Rural Lands, 1950, with Special Reference to Grazing. U.S. Dept. Agr. Cir. 909, 100 pp., illus. 1952.

Ensminger, M.E., Galgan, M.W., and Slocum, W.L. Problems and Practices of American Cattlemen. Wash. Agr. Expt. Sta. Bul. 562, 89 pp., illus. 1955.

Evans, M. Sorghum Production in New Mexico. Part I. Production and Price. N. Mex. Agr. Expt. Sta. Bul. 371, 31 pp., illus. 1952.

Fisher, C.E., and others. Control of Mesquite on Grazing Lands. Tex. Agr. Expt. Sta. Bul. 935, 23 pp., illus. 1959.

Gabbard, L. P., Bonnen, C.A., and Tate, J.A. Planning the Ranch for Greater Profit. Tex. Agr. Expt. Sta. Bul. 413, 45 pp., illus. 1930.

_____ and Cherry, R.G. Trend of Taxes on Farm and Ranch Real Estate in Texas, 1890-1946. Tex. Agr. Expt. Sta. Bul. 702, 34 pp., illus. 1948.

Gray, J.R. Availability and Use of Agricultural Credit in New Mexico. N. Mex. Agr. Expt. Sta. Bul. 431, 37 pp., illus. 1958.

_____ Factors Affecting Sizes of Agricultural Loans in New Mexico. N. Mex. Agr. Expt. Sta. Res. Rpt. 42, 16 pp., illus. 1960. [Mimeographed.]

Hagood, M.J. Farm-Operator Family, Level-of-Living Indexes for Counties of the United States, 1930, 1940, 1945, and 1950. 83 pp., illus. U.S. Bur. Agr. Econ., Washington. 1952. [Mimeographed.]

Hauter, L.H., Walker, A.L., and Wells, O.V. Economics of Agriculture on Dry Land Farms in Eastern New Mexico. Part 1, A Five-Year Economic Study of 125 Farms in Curry and Roosevelt Counties, New Mexico. N. Mex. Agr. Expt. Sta. Bul. 186, 70 pp; Part 2, Production Requirements, Costs, and Returns. N. Mex. Agr. Expt. Sta. Bul. 187, 59 pp., illus. 1930.

Hecht, R.W. Labor Used for Livestock. U.S. Dept. Agr. Statis. Bul. 161, 22 pp. 1955.

_____ and Vice, K.R. Labor Used for Field Crops. U.S. Agr. Res. Serv. Statis. Bul. 144, 45 pp. 1954.

Hunter, B., Cockerill, P.W., and Pingrey, H.B. Type of Farming and Ranching Areas in New Mexico. Part 1. N. Mex. Agr. Expt. Sta. Bul. 261, 68 pp; Part 2. N. Mex. Agr. Expt. Sta. Bul. 267, 134 pp., illus. 1939.

Jennings, R.D. Feed Consumed by Livestock, 1941-42, by States. 108 pp., illus. U.S. Bur. Agr. Econ., Washington. 1946. [Mimeographed.]

_____ Feed Consumed by Livestock, Supply, and Disposition of Feeds, 1949-50, by States. U.S. Dept. Agr. Statis. Bul. 145, 74 pp., illus. 1954.

_____ Relative Use of Feeds for Livestock Including Pastures--by States. U.S. Dept. Agr. Statis. Bul. 153, 59 pp., illus. 1955.

Johansen, S. The Population of New Mexico, Its Composition and Changes. N. Mex. Agr. Expt. Sta. Bul. 273, 56 pp., illus. 1940.

Knox, J.H., and others. Research on the College Ranch. N. Mex. Agr. Expt. Sta. Bul. 359, 32 pp., illus. 1951.

_____ and Watkins, W.E. The Use of Phosphorus and Calcium Supplements for Range Livestock in New Mexico. N. Mex. Agr. Expt. Sta. Bul. 287, 18 pp., illus. 1942.

Lingard, H.T. Farm Mortgage Loans and Their Distribution by Lender Groups, 1940-48. U.S. Dept. Agr. Cir. 812, 63 pp., illus. 1949.

Lloyd, R.D., and Hecht, R.W. Overhead Labor on Northern Nevada Cattle Ranches. Nev. Agr. Expt. Sta. Bul. 209, 32 pp., illus. 1959.

McGee, A.C. Goats Pay for Clearing Grand Prairie Rangelands. Tex. Agr. Expt. Sta. Misc. Pub. 206, 8 pp., illus. 1957.

Merrill, W.L. Costs and Returns of Selected Management Practices of Southwestern Cattle Ranches. 1960. [Unpublished master's thesis. Copy on file Sacramento State College, Sacramento, Calif.]

Morrison, F.B. Feeds and Feeding. 20th ed., 1050 pp. Morrison Publishing Co., N.Y. 1946.

Motheral, J.R., and Adkins, W.G. Texas Farm and Ranch Land Prices, 1951. Tex. Agr. Expt. Sta. Prog. Rpt. 1479, 8 pp. 1951. [Mimeographed.]

_____ Southern, J.H., and Crockett, S.T. The Price of Texas Farm and Ranch Lands, 1920-1945. Tex. Agr. Expt. Sta. Bul. 688, 39 pp., illus. 1947.

National Education Association of the United States. Committee on Tax Education and School Finance. Status and Fiscal Significance of Federal Lands in the Eleven Western States; A Survey. 207 pp. Washington. 1950.

Norris, J.J., and Valentine, K.A. Principal Livestock-Poisoning Plants of New Mexico Ranges. N. Mex. Agr. Expt. Sta. Bul. 390, 78 pp., illus. 1954.

Parr, V.V., Collier, G.W., and Klemmedson, G.S. Ranch Organization and Methods of Livestock Production in the Southwest. U.S. Dept. Agr. Tech. Bul. 68, 104 pp., illus. 1928.

Reynolds, H.G., and Springfield, H.W. Reseeding Southwestern Range Lands With Crested Wheatgrass. U.S. Dept. Agr. Farmers' Bul. 2056, 20 pp., illus. 1953.

Saunderson, M.H. Western Land and Water Use. 217 pp. Univ. Okla. Press, Norman, Okla. 1950.

Savage, D.A. Grass Culture and Range Improvement in the Central and Southern Great Plains. U.S. Dept. Agr. Cir. 491, 56 pp., illus. 1939.

Smith, H.V. The Climate of Arizona. Ariz. Agr. Expt. Sta. Bul. 197, 112 pp. 1945.

Southern, J.H., and Adkins, W.G. The Texas Farm and Ranch Land Market, 1953. Trends in Land Prices and Volume of Land Sales, 1940-53. Tex. Agr. Expt. Sta. Prog. Rpt. 1696, 11 pp. 1954. [Mimeographed.]

Stallings, J.L. Forage Harvesting Costs in New Mexico. N. Mex. Agr. Expt. Sta. Bul. 432, 32 pp., illus. 1959.

Stanley, E.B., and Armer, W. The Cattle Ranching Industry in Arizona. Ariz. Agr. Expt. Sta. Rpt. 54, 12 pp. Rev. 1951. [Mimeographed.]

Staten, G.H., Pingrey, H.B., and Wilson, M. Irrigated Pastures in New Mexico. N. Mex. Agr. Expt. Sta. Bul. 362, 28 pp., illus. 1951.

Stevens, I.M., and others. Marketing Western Feeder Cattle. Wyo. Agr. Expt. Sta. Bul. 317, 92 pp., illus. 1952.

Strickler, P.E., and Hines, C.A. Numbers of Selected Machines and Equipment on Farms With Related Data. U.S. Dept. Agr. Statis. Bul. 258, 30 pp. 1960.

Strohbehn, R.W., and Wunderlich, G. Land Ownership in the Great Plains States, 1958. A Statistical Summary. U.S. Dept. Agr. Statis. Bul. 261, 80 pp., illus. 1960.

Taylor, M.E. Farm Credit in a Southern Great Plains Drought Area. A Study of Cimarron and Texas Counties, Okla., 1950-54. U.S. Agr. Res. Serv. ARS 43-12, 74 pp., illus. 1955.

Texas Agricultural Experiment Station, Department of Animal Husbandry. Beef Cattle Investigations in Texas, 1888-1950. Tex. Agr. Expt. Sta. Bul. 724, 79 pp., illus. 1950.

Thompson, N.O. Sharing Farm Machinery. Ariz. Agr. Expt. Sta. Bul. 187, 14 pp., illus. 1943.

U.S. Agricultural Marketing Service, Crop Reporting Board. Prices Received by Farmers for Beef Cattle, United States and by States, Monthly and Annual Average, 1909-59. U.S. Dept. Agr. Statis. Bul. 265, 74 pp. 1960.

U. S. Bureau of Agricultural Economics. Agricultural Finance Review, Vol. 13, 117 pp., illus. Washington. 1950.

_____. Crop Production Practices, Labor, Power, and Materials. Sec. 4, Great Plains; Sec. 5, Mountain States and Pacific States. U.S. Bur. Agr. Econ. F.M. 92. 1953. [Mimeographed.]

_____. Crops and Markets. Monthly 1930-42; quarterly 1943-47; annual 1948-53. Washington, U.S. Govt. Print. Off.

_____. Income Parity for Agriculture . . . Pt. 2, Secs. 3-5 and Pt. 3, Sec. 4. Washington. 1939-41.

_____. Western Livestock Marketing Research Technical Committee. Shifts in the Trade in Western Slaughter Livestock. U.S. Dept. Agr. Agr. Inform. Bul. 14, 67 pp. 1950.

U.S. Bureau of the Census. U.S. Census of Agriculture: 1954. Vol. 3, Special Reports, Pt. 9, Farmers and Farm Production in the United States. Chapter 6, Western Stock Ranches and Livestock Farms. 24 pp., illus. U.S. Govt. Print. Off., Washington. 1956.

U.S. Department of Agriculture. Agricultural Conservation Program. Annual. 1943-51, 1954. U.S. Govt. Print. Off., Washington.

_____. Agricultural Statistics. Annual 1940-53. U.S. Govt. Print. Off., Washington.

_____. Yearbook of Agriculture. 1938, Soils and Men; 1941, Climate and Man. U.S. Govt. Print. Off., Washington.

Valentine, K.A. Effect of Water-Retaining and Water-Spreading Structure in Revegetating Semidesert Range Land. N. Mex. Agr. Expt. Sta. Bul. 341, 22 pp., illus. 1947.

Voorhies, E.C. Trade in Western Livestock at Auctions. Calif. Agr. Expt. Sta. Bul. 740, 67 pp., illus. 1954.

Weaver, J. E., and Albertson, F.W. Grasslands of the Great Plains. 395 pp. Johnson Publishing Co., Lincoln, Nebr. 1956.

Wooten, E.O. The Relation of Land Tenure to the Use of the Arid Grazing Lands of the Southwestern States. U.S. Dept. Agr. Dept. Bul. 1001, 72 pp. 1922.

_____. H. H. Major Uses of Land in the United States. U.S. Dept. Agr. Tech. Bul. 1082, 100 pp., illus. 1953.

Yarnall, S.L. Farm Mortgage Interest Charges and Interest Rates, 1940-48. U.S. Dept. Agr. Cir. 821, 30 pp., illus. 1949.

Youngblood, B., and Cox, A.B. An Economic Study of a Typical Ranching Area on the Edwards Plateau of Texas. Tex. Agr. Expt. Sta. Bul. 297, 437 pp., illus. 1922.